The Scientific Review,

AND

SCIENTIFIC AND LITERARY REVIEW,

A RECORD OF PROGRESS IN ARTS, INDUSTRY, AND MANUFACTURES,

INCORPORATING THE

Journal of the Inventors' Institute.

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(*Continued on page* 13).

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JANUARY 1, 1877.

THE INVENTORS' DINNER.

At the present moment when a scheme is brought forward by the Society of Arts, under the captivating title of Patent Law Reform, which, all who read it as set forth in another column, will at once perceive does not include Reduction in the cost of Patents; an omission that will, if the scheme be practically realized, leave inventors as badly off as ever; we consider it right to give a prominent position to the proceedings at the Inventors' Dinner on 30th November ult..

The Dinner of the Inventors' Institute and friends of the Inventors' cause took place on 30th of November, 1876, at St. James's Hall, Piccadilly, Sir Antonio Brady, President of the Institute, being in the chair, supported by Admiral Selwyn, Mr. Hume Williams, Barrister-at-law; Mr. F. H. Varley, C.E., C.E.C.I.I.; Mr. T. Morgan; Mr. J. P. Cutts (a Director of the Inventors' Patentright Association); Dr. J. McGrigor Croft; Mr. Smith, Mr. M. M. Harris; Mr. F. W. Campin, Secretary of the Inventors' Institute, and other gentlemen interested in the progress of invention. The list of gentlemen named as Stewards, included amongst others—Sir Arthur Cotton, K.C.S.I., &c.; W. Donisthorpe, Esq.; Sir D. Salomons, Bart.; M. Zingler, Esq.; Captain Fairholme, R.N.; Dr. J. McGrigor Croft; H. Roman, Esq.; H. Somerset Mackenzie, Esq.; H. A. Allardyce, Esq.; T. Paterson, Esq.; T. Waller, Esq., C.E.; William Smith, Esq., C.E., Inst.C.E., &c.; A. Hilderbrandt, Esq., C.E. and M.E.; S. Calley Esq.; D. O. Macomber, Esq.; H. G. Hellier, Esq.; D. J. McLauchlan, Esq.; John S. Farmer, Esq., C.E.; R. C. Rapier, Esq., C.E.; E. Harris, Esq.; Peter Love, Esq. The Dinner Committee consisted of Messrs. F. H. Varley, and F. W. Campin; and its Hon. Secs., Messrs. Marshall M. Harris, and Thomas Morgan.

After an excellent dinner, which was admirably served,

The Chairman gave the usual loyal and constitutional toasts, which were received with customary honours.

The toast of the Army, Navy, and Volunteers was next given, coupled with the names of Admiral Selwyn and Capt. Fairholme. In referring to the present position of the navy,

The President said that the wooden walls of England were once the great boast of the country, but now, what with iron-clads, rams, and torpedoes, it was impossible to say what the future of naval warfare would be; but he was satisfied that whatever might be the changes in the condition of the navy, the sailors of her Majesty's ships would be found in the future as they had been in the past, equal to the duty of defending the shores of England against any foreign invasion. (Applause.)

Admiral Selwyn responded, and after some preliminary observations, said that it was perfectly true, as the Chairman had stated, that the position of the navy had been materially altered in recent years. In fact, the improvements in the construction of ships, or iron-clads as they are now called, and in the manufacture of guns and torpedoes had been carried to such perfection that in process of time there was a very good chance that the unfortunate sailor would be improved off the face of the earth, or rather the surface of the ocean. (Cheers and laughter). It was high time they turned their attention a little towards keeping vessels afloat rather than to sinking them under the sea. As a rule, sailors were a practical body of men who do not turn their attention very largely to the question of improving their position and of adapting their means to the end, but the Institute, the opening of the Annual Session of which they were celebrating that evening, applied itself towards that object, and it was very important that its aims should be fully understood. The promotion of invention, for the good of all was its main object, and it was only by united action and by making common cause that they, as inventors, could hope to succeed, and he was glad to find present that evening so many representatives of their class of whom it might be said that they were not merely the advisers, but the prophets of the age. As a rule, however, inventors received as little recognition as the prophets of a former time, notwithstanding that their labours had materially contributed not only to the defence, but the welfare of the nation. (Applause). It seemed to him, however, that there were many fields in the peaceful walks of life in which the inventor might be usefully occupied without going into the question of devising the most destructive implements of war. In fact, the true field which the inventor ought to occupy was that which would tend to develope the resources and the wealth of the country upon which, to a great extent, the true interests of the people depended; as a general rule the Governments who were most served by inventors had proved the most ungrateful, and those persons who had devoted the greatest attention to the means of defence were those who received the least reward. A proof of this was to be found in the present position of the Patent Laws of the country—laws which contained provisions very discouraging to inventors. In regard to the Patent Laws, a more suicidal, effete, and foolish policy could not be adopted than that of levying on inventors' fees, which were altogether disproportionate to services rendered, and which prevented men taking out patents for inventions that might prove very serviceable to the public. It seemed to him that in such matters it should not be a question of how much the Government ought to receive for granting a patent, but how little they could charge for the protection granted in order to induce inventors to come forward with their inventions. (Applause). In this latter respect, as well as in some other points, the Patent Laws of the United States were much superior to those of England, and although there was much in the American law to which objection might be taken, there was, nevertheless, a great deal which might be copied with advantage. As far as the Inventors' Institute was concerned, its objects were to endeavour as far as possible to take advantage of the best parts of the American system without introducing any of its evils. Under a better system than at present existed there was no country in the world which could keep pace with England in the production of those inventions, which would not only place her army and navy in the best position as regards the appliances of warfare, but would from a commercial point of view, enable this country to keep her place as one of the foremost nations of the world. (Applause.)

Capt. Fairholme, R.N., also responded to this toast, as did Dr. J. McGrigor Croft for the Volunteers.

The Chairman, in proposing the toast of the evening, "Success to the Inventors' Institute," commenced by observing that Admiral Selwyn had to a great extent taken the wind out of his sails. (Laughter.) Still, he thought there was enough left to be said with regard to the Institute without repeating anything that had been already said. In his opinion, upon the encouragement of invention depended the continued prosperity and greatness of the nation. It was perfectly clear that this small island of ours could only retain her position as a centre of manufacture by the superior skill of our artizans. He was, as they all knew, an advocate of technical education for the artizan classes, and he held that it was greatly by such means that England could maintain her permanent position in trade and commerce against the other nations of the world. (Hear.) It was a lamentable fact that England had lost her American trade in iron — amounting to some millions annually — principally, through the want of skill on the part of those engaged in the trade, but unfortunately the result was an accomplished fact. He had lately returned from a visit to the United States, and he had there seen seams of coal 70ft. thick within three miles of the Atlantic seaboard, as well as deposits of iron which could be raised and wrought at a less price than was demanded to raise it from our English mines. If England intended to hold her own in the field of commerce, she could only do so by the production of inventions, which would enable her to cheapen the cost of manufacture. What they wanted was better materials, better machinery, and more skilled labour. In the great Exhibition of 1851 there were few articles of commerce shewn in which Englishmen did not excel, but in the subsequent Exhibition of 1862 it was found that the foreigner had followed so closely upon our heels than in many instances they were enabled to produce better fabrics, manufactured with more taste than those exhibited by English manufacturers. He therefore held that upon the genius of inventors the position of the English nation must continue to depend. (Hear, hear.) In these days capital would acknowledge no allegiance to any country—it would go to those places where it could be best and most advantageously employed, and, what was more, labour would follow the capital, and the people who had skill, and invention would seek their livelihood in those countries where their services would receive the best reward. It was, therefore, of the greatest possible importance to this country, if it were to maintain its prestige as a nation, that both capital and labour should be encouraged to stay at home, and this could only be done by the enactment of such laws—patent laws to be more precise—as would foster inventions and still keep England predominant in the world. If they had a good patent law, that was to say, a law which really encouraged the inventor by enabling him to secure protection for his inventions, Englishmen would be enabled to hold their own against the world. (Applause). One of the greatest evils of the present system was that two persons hitting upon the same idea, and producing an invention, and obtaining what they supposed to be protection, whilst in fact the money which they expended was in reality thrown away. Now, he protested against anything of the kind. If they had a law of copyright which gave to the author protection for a period of forty years, why should not the inventor be entitled to some advantages? Such a contention was, he maintained, a perfectly fair one, and he hoped that through the agency of the Inventors' Institute they would be able to induce the Government to bring in a Bill for amending the Patent Law in such a manner as to make it satisfactory to all parties. The principal points which seemed to him to require attention were first, the present difficulty of ascertaining whether any right of priority existed; and, secondly, the reduction in the cost of the patent. In regard to the first, what they wanted was a better system of registration. As inventors, they hoped to go further than that by making the Government responsible. But the grand cardinal point was that a patent once taken out should be made the absolute property of the inventor, and should be granted on such easy terms as to place protection within the reach of the artizan classes. (Applause.) After having gained those points, the next step which seemed to him to be important was to try and assimilate the Patent Laws of this and other countries; and he felt confident that if inventors went to the Government as an united body, they would be able to secure all the improvements which were essentially necessary. (Applause.) In conclusion, the Chairman said he had much pleasure in proposing "Success to the Inventors' Institute." (Cheers.)

Mr. **Hume Williams**, Barrister-at-Law, in replying to the toast of the Inventors' Institute, stated that he felt that no more important theme could call for the attention of any man than that of how best to promote the progress of invention. On what he might ask, did the greatness of the country depend? was it not in holding the foremost position in all that pertained to the advancement of civilization, and as regarded this what could be more important than the improvement of our arts and manufactures? (Applause.) If this were the state of the case, he felt that no higher or nobler work could possibly exist than that which was taken up by the Inventors' Institute, which did not seek to aggrandise one class at the expense of another, or to render the interest of the public subservient to private advantage, but aimed simply and solely at obtaining justice to the inventor, whereby invention would be promoted, manufactures advanced, and the progress of civilization receive an onward movement. (Applause.) As he, like Admiral Selwyn, Dr. McGrigor Croft, Mr. Campin, Dr. Collyer, and Mr. Newton Wilson, was a member of the Inventors' Institute *ab orgine*, he felt much gratified in having to respond to the toast which was doubtless as worthy of hearty reception as any that could be introduced to their notice. The great fault of the Patent Laws at present was that they were unsettled. As far as he understood the question of what the Inventors' Institute sought, it was that the Patent Laws should be placed on a basis which would enable inventors to obtain protection without unnecessary circumlocution or expense; but he thought there was no necessity for revolutionary changes in the system. (Hear, hear.) He quite endorsed the opinion of the Chairman that unless some such amendment of the law as he had referred to were effected, the position of England could not be maintained. (Applause.)

Mr. M. M. **Harris** also responded to this toast, remarking that he quite concurred in the statements of Mr. Hume Williams, and having held the position of Treasurer of the Institute—which he had been compelled by ill-health to resign—he would add these words: "Do not be contented with giving the Inventors' Institute your approbation, give it pecuniary support."

Mr. **Campin** proposed the "Inventors' Cause," remarking that having all his life been engaged in advancing that cause, he felt much pleasure in proposing this toast. After what had been said by the previous speakers, he would not weary his friends by dwelling upon the importance of invention and the value of inventors. Everyone who had powers of observation and reflection must at once see and know that in the present position of affairs the inventor and his labours were as much a matter of necessity as any of the ordinary avocations of daily life. What he would specially draw attention to was that there ought to be something done to make the Patent Laws better. The Lord Chancellor had brought forward two Bills in two successive sessions, and withdrawn them. Why? Because they proposed to effect changes in the Patent Laws that would have made them onerously oppressive to the inventor; and when this was made known to the public by the Inventors' Institute, public opinion declared against these Bills. To his own mind the matter was very simple; it was, to a great extent, a matter of money. (Hear, hear.) We want cheaper patents, combined with a better administration of the Patent Office, so that patents when obtained should have a more *bona fide* character. (Applause.) It was curious, however, that some eighteen years ago he had got a Bill brought into the House of Commons to reduce the cost of patents to less than one-half of the present charges, and this was thrown out by the opposition of the present Lord Chancellor, then Attorney-General. If inventors wanted justice they must do as everyone else had to do, they must agitate for it; and, as the cause was a good one, they had a right to expect success. (Applause.)

Mr. F. H. **Varley** in rising to respond to this toast said that having been an active worker in the Executive of the Inventors' Institute, he felt much could be done to help the inventor, if the inventor could only be got to help himself a little; but this was just the most difficult work of all. However, the inventors' cause was no mean or selfish one, for it was really a national question; nay, more than that, a question of civilization and progress, and he trusted that our legislators would soon come to understand that the cause of the inventor was one superior to all others.

Dr. R. H. **Collyer** proposed as a toast the "Poor Inventor," in a speech characterised by fervid eloquence; he was much applauded throughout. For want of space we have to reserve this for future notice.

Mr. **Newton Wilson** and Mr. **Blanchett** were called upon to reply; but a vote of thanks to Sir Antonio Brady, who was obliged to leave the chair, was then taken and passed amidst great applause. Sir Antonio acknowledged this vote, and Admiral Selwyn took the chair amidst hearty cheers. He proposed the health of "The Visitors."

Mr. **Henry Broadhurst**, as Secretary of the Parliamentary Committee of the Trades Congress, felt great pleasure in acknowledging this toast; he had given much attention to the patent question, and felt that it was one of great importance to the country as well as to the class, whose interests he was bound to look after. At that late period of the evening he would not give them a long speech, but would merely remark that he should do his best to promote cheap patents and effective protection for the efforts of inventors.

Mr. J. P. **Cutts** (a Director of the Inventors' Patent Right Association) also responded to this toast.

Mr. E. **Harris** said—In returning thanks for the cordial manner in which you have responded to the toast, I do not propose on this occasion of convivialty to take up much of your time; however, I may at least remark that the Patent Laws of Great Britain require amendment, and the Inventors' Institute, whose proceedings I have watched with interest for some years, has done service, and I am glad to find is still working to secure the required alterations; and, doubtless, its members will continue to persevere until their efforts are crowned with success. Patents should be cheaper, and patentees better secured than at present. Legislation to that effect would be a boon to those who are now inventors, and an incentive to others who are not inventors to become so. I have lived in most of the South American republics and in the empire of Brazil, besides having spent upwards of fifteen years in the United States, and some nine years in the British Colonies of North America and Australia; and am a patentee and patent proprietor both in Canada and the United States. Some of the South American republics, instead of patents, grant concessions; and these concessions are most generally obtained, directly or indirectly from members of the administration, frequently entirely regardless of public interests. As an instance, a certain republic granted to a native of the United States, an acquaintance of mine, the valuable privilege of the sole right to import kerosine oil and lamps into the country, and, as a consequence, both oil and lamps were sold at most exorbitant prices to the public, who were filched out of some millions in three or four years, the money going into the pockets of the concessionaire and the official or officials by whom the concession was granted. Our Patent Laws, although unsatisfactory, are an improvement upon such a system as that. In the United States of America the Patent Laws are the nearest to perfection. There a patent for seventeen years costs only £7, £3 being payable on application, and £4 within six months after the patent is granted; and I speak from personal knowledge and experience when I say that the examiners and other officials at the Patent Office in Washington are remarkable for their official zeal, their patience, courtesy, and willingness at all times to give advice, render assistance, and afford every possible facility and information to inventors and their agents. Our American cousins, doubtless, are very inventive; but it does not follow that Britishers are by nature behind their cousins in inventive genius; but in Great Britain there is only a modicum of inducement held out to invent. It is not worth the while of a poor man to invent, because he cannot afford to patent his invention, and the capitalists are small in number who will risk the necessary outly even for a large share of the patent. Hence the inventive genius of our countrymen lies dormant and uncultivated. Let us hope that by the next annual session of the Institute the number of its members will be largely augmented, and that by their continued agitation, and the assistance of their friends, both in and out of Parliament, the needed reforms will be granted.

Mr. Smith, C.E., also responded to this toast.

Dr. J. McGrigor Croft proposed the "Dinner Committee," remarking that the object they all had in view, namely, improved Patent Laws, and greater facilities for development of inventions were likely to be much forwarded by social gatherings like the present, and hence he thought the thanks of all who had participated in the excellent dinner they had partaken of, and the social intercourse that had accompanied it were due to those who had taken upon themselves the work of arranging and carrying out such a pleasant and, as he hoped, useful gathering.

Mr. Thomas Morgan, A.S.E., responded to this toast.

"The Press" was proposed from the chair, and responded to by Dr. Lempriere.

Mr. Campin, Secretary of the Inventors' Institute, was also toasted, and after a vote of thanks to Admiral Selwyn for his conduct in the chair as successor of Sir Antonio Brady, the company dispersed.

AMERICAN PATENTS.

The total receipts of the United States Patent-office, in the year ending September 30th 1876, were 787,697 dols. The total expenditure of the office in the same period was 661,638 dols. In this latter total salaries figured for 437,280 dols., contingent expenses for 54,351 dols., and photo-lithographing back issues for 66,025 dols. There were 22,408 applications for patents received during the year, and 15,911 patents were issued in the course of the twelve months; 3,613 patents were allowed but not issued, the final fees not having been paid. There were also 1,037 trade marks and 499 labels registered during the year, and 2,943 caveats were filed in the same period. Only two patents were extended during the year.

Reviews.

DR. COLLYER ON AUTOMATIC WRITING.

"Automatic Writing: the Slade Prosecution. Vindication of the Truth." By Robert H. Collyer, M.D., Original Discoverer of the Anæsthetic Process in rendering Surgical Operations painless; Original Discoverer of Induced Mental Hallucination, commonly called Electro-Biology; Original Discoverer of Phreno-Mesmerism. and other Phenomena connected with an Exalted State of the Nervous System. London: H. Vickers, 317, Strand. 1876.

This pamphlet, like all productions from the pen of Dr. Collyer, is clear and forcible; and certainly what he states with regard to Slade and his so-called spirit-writing should cause everybody to pause and give the matter further consideration before they venture to decide that Slade is a mere juggler and imposter. Dr. Collyer begins by quoting the following passage of Holy Writ: "All this, said David, the Lord made me understand *in writing* by his hand upon me, even all the works of this pattern."—1 Chron. xxviii., v. 19. And states:—

I do not believe in the spirltualistic explanation of the mental phenomena presented during certain abnormal states of brain.

These phenomena, in all their various phases, have occupied my serious attention for the last thirty-five years.

When I first advocated the necessity of abolishing pain in surgical operations in the years 1840, 1841, 1842, and 1843, I was met by jeers, scoffs. ridicule, contempt, and every species of insult; there was not a disrespectful epithet in the whole vocabulary which was not applied to my efforts to relieve mankind from the suffering attendant on a surgical operation! Nor was it until June 11th, 1870, that my claim—as the original discoverer—was publicly recognized by the London *Lancet*, which in the "History of Anæsthetic Discovery," says:—"*Dr. Collyer is, to our minds, the true pioneer after all—the man who ran first.*"

I am therefore prepared and well-seasoned in the abuse and calumny which awaits this vindication of the truth—as shown in automatic writing, and various other mental phenomena, during exalted states of brain function.

Dr. Collyer proceeds to consider in detail the case presented against Slade, and after narrating his own experience of Slade's power of producing automatic writing, which he considers satisfactory, he adds, quoting from his own work on "Exalted States of the nervous System":—

At page 106 I state: "The embodiment of thought is the cerebral representation or production of the figure thought of. If there be sufficient nervo-vital fluid at the command of the medium, he is enabled to PROJECT *an embodiment* which will, for the time being, under the direction of the Will-power, manifest all the conditions of *an independent existence.*"

The medium must necessarily be an extremely sensitive person—even morbidly so. How, then, is it possible that he can be calm and self-possessed, exercise mental concentration or will-power, if he is purposely rendered irritable; his sensitiveness wounded by wanton, puerile opposition? It cannot be expected that if the necessary conditions to success are destroyed that succesful results can follow. It would be as unphilosophical to break your watch and then to grumble because it ceased to keep time.

No man is a greater admirer of pure philosophy and close inductive reasoning than myself. I also abhor with detestation and contempt those upstart parvenus in science who imagine that by *coup de main* they can solve the most recondite revelations of brain function. It cannot be forgotten that the College of Physicians of London ignored both Harvey and Jenner. It should not be forgotten that the Royal Society of Great Britain received the report of Benjamin Franklin's experiments, showing the identity of lightning with other electrical phenomena, *with a shout of laughter.*

Napoleon referred the subject of *steam navigation* to the Academy of Science. The result was, that the Academy pronounced the idea to be "a *ridiculous notion.*" When George Stephenson first proposed railroad travelling, how was the idea treated by the British House of Commons? Did not his distinguished son, Robert Stephenson, with all England, ridicule the French project of digging a canal at Suez? Still, the British nation a few years subsequently gave four millions sterling for an interest in the same canal! Who, fifty years since, would not have been pronounced a madman if he had had the temerity to state the practicability of holding in a few minutes, communication with his friends in Australia? Cases could be multiplied showing the ignorance of the most intellectual on matters which are beyond their knowledge. The universe abounds in mysteries, exciting only the barren wonder of the desponding observer, but stimulates the philosophical to untiring and earnest research. To contradict past experience is a certain indication of error; to march beyond it is the truest indication of genuine discovery. If ignorance is punishable with three months' hard labour, who could escape having the amusing task of continually walking up stairs?

Slade is not responsible for his want of knowledge as to the *modus operandi* of the most recondite phenomena connected with cerebral function. All he knows is, that these phenomena do occur under certain conditions. It is not because he verily believes that they are produced by the spirit of his late wife, that such a belief comes within the sphere of criminal jurisdiction. I am not responsible for Slade's ideas. I am thoroughly convinced he is honest in his belief. What concerns myself is the production of these cerebral phenomena. Of the fact that they are produced without the least attempt to trickery or fraud, is a conviction arrived at after thirty-five years' investigation. That many persons having partially developed powers, have *resorted to deception* I am equally convinced of. I have discovered on many occasions false representations, but these do not militate against the genuine phenomena.

The Conclusion is irresistible that the prosecutors were *mistaken*, which error, at some future time, they will, no doubt, acknowledge, when they have matured their capacity to become original investigators.

I am preparing for the press a full explanation of the *subjective* and OBJECTIVE states of brain during abnormal states of that organ.

In conclusion I must, with St. Austin, say:—

"Let them laugh at me for speaking of things which they do not understand, and I must pity them while they laugh at me."

HARLEY AND BROWN'S HISTOLOGY.

"Microscopical Animal Demonstrations and Histological Demonstrations: a Guide to the Microscopical Examination of the Animal Tissues in Health and in Disease." Being the substance of lectures delivered by George Harley, M.D., F.R.S., formerly Professor in University College, London, and Physician to University College Hospital. Edited by George T. Brown, M.R.C., Professor of Veterinary Medicine, and one of the Inspecting Officers in the Cattle Plague Department of the Privy Council. Second Edition. London: Longmans, Green & Co., 1876.

Although this book deals principally with subjects falling within the scope of medical science, yet, as containing highly interesting accounts of microscopical investigations such as anyone who takes an interest in these matters will find much pleasure in perusing, we deem it our duty to present our readers with a notice of so valuable a work, and though it has now reached a second edition, briefly explain its plan in terms quoted from the work itself.

In the first place, the construction of the microscope is considered with reference to its optical and mechanical principles; and the various pieces of apparatus are shortly described.

Secondly, directions are given as to the arrangement of the instrument, the preparation of the slides, the position for the light, and the method of focussing the lenses.

Some general suggestions are then offered for the preparation of objects for examination; and lastly, under their several heads, the tissues of the animal body are concisely described, and the manner of preparing them for observation pointed out. In every instance a figure or diagram is given, with which the observer is enabled to compare the specimen, and thus ascertain how far his mode of preparation has been successful. A large number of woodcuts have consequently been found necessary for the purpose of illustrating the appearance which every well prepared specimen should exhibit. Most of them were drawn from objects prepared exactly in the manner directed. Advantage has also been taken of Dr. Kölliker's kind permission to use some of the woodcuts from his large work on microscopic anatomy, and a few illustrations have been copied from Todd's "Cyclopædia of Anatomy."

The work has undergone a careful revision, although its general plan has been scrupulously adhered to. "On sitting down," says Dr. Harley, to revise the book, "my first idea was to dilate on some of the subjects, but upon inquiry it was ascertained that, brief though the descriptions of the different modes of investigation are, they are nevertheless found to be adequate to the wants of the ordinary student; by whom it appears that the brevity is regarded as an actual advantage. It has therefore still been maintained."

CRACROFT'S TRUSTEES' GUIDE.

"Cracroft's Trustees' Guide: A Synopsis of the Ordinary Powers of Trustees in regard to Investments, with practical directions, a Digest of Reported Decisions on Trust Investments since the year 1743, and Tables of Securities." Twelfth edition. London: Charing Cross. Bernard Cracroft, 5, Austin Friars, E.C.

This work, which has reached a twelfth edition since its first issue in 1873, is simply termed the "Trustees' Guide," but might very appropriately be called the "Trustees' and Investor's Guide;" and although not of the class of works which come directly within our sphere of action, is so remarkable and praiseworthy, whether in legal, statistical, or financial aspects, that we cannot refrain from noticing it in our columns. It is divided into three parts:—(1) On the powers of investment by trustees; (2) A digest of reported decisions bearing on investments by trustees; and (3) Tables of securities. The third part of the work is as useful to investors generally as to trustees, and forms of itself fully two-thirds of the entire book.

The digest above mentioned professes to contain all the reported cases that are of any real service as guides to trustees, and wherever a case has been omitted, to have omitted it solely in order not to multiply reference to well settled points. When we add that, in its preparation, *Chitty's Equity Index*, the *Law Digest*, the *Law Reports Digest*, and the digest contained in each of the twenty-three volumes of the *Weekly Reporter*, have been gone through under the titles "Investments," "Trustees," "Executors," "Settlement," "Will," &c., it will be seen, that not only is there a vast quarry of important and curious fact offered to trustees in general, but that solicitors and barristers are presented with a means of vastly abridging their labours and economising their time. Both the first part and the second part we are told were drawn up and settled by lawyers and barristers of experience and ability.

The third part is strictly financial, and forms, in fact, a dictionary of securities, containing, among other things, a *history of the prices* of the leading securities for several, generally seven or eight years. We have also presented to us, for instance, what we do not know where to find elsewhere, a complete and methodical account of the routine of the transfer of British Government securities.

Indian Government securities, Colonial Government loans, foreign Government securities, the Municipal, &c., loans, are all of them dealt with in a satisfactory way.

NICOLS' PUZZLE OF LIFE.

"The Puzzle of Life, and how it has been put together. A short History of Vegetable and Animal Life upon the Earth from the Earliest Times. Including an Account of Prehistoric Man, his Weapons, Tools, and Works." By Arthur Nicols, F.R.G.S., with illustrations by Frederick Waddy. London: Longmans, Green & Co., 1877.

This admirable little book is intended principally for the use of children, and we cannot give a better idea of its contents than by adopting the author's own prefatory observations.

"Having found that children could be interested in the history of life upon the earth, and that it appealed forcibly to their understandings, I considered that a little book upon the subject might give them the taste for more extended study in after years. The difficulty of treating the, to them, novel conclusions of geology, often founded on abstract reasoning, in language at once simple in form yet stating clearly the great principles upon which this reasoning rests, will probably be apparent on every page. Breadth, rather than minuteness, has been aimed at, in the belief that a general view, not overcrowded with details, is likely to be the most impressive. Thus, in the geological part, the leading features of the succession of strata have been preserved, but no details of systematic classification entered into. Similarly, primeval man is considered mainly with reference to gradual progress from a rude to a more civilized condition. To have been more explicit, where there is still much difference of opinion, would have obscured the main facts of the evidence for man's great antiquity. I have not thought it advisable to follow the example of some popular writers on scientific subjects, in distorting the grand view of creation opened by geology, by obscuring it in the mist of romance. Children soon begin to look with contempt on fiction when applied to natural philosophy, and I would not consciously impose on them the grave task of unlearning anything. Some superficial interest may be thus lost, but with the growth of the mind the conviction will come that no fairy tale has a stronger claim to a hold upon the imagination than the simple truths of science. The illustrations are typical examples of the three arbitrary but convenient divisions of the history of life—the vegetable, the animal, and the human—such as will be most readily met with in museums. Slight as this sketch is, the liking for it shown by some intelligent children, who have seen it in manuscript, encourages me to believe that there are many others to whom it will prove interesting.

"Some acquaintance with the leading facts in science is daily becoming more necessary to those who aspire to liberal culture, and instruction in them is now almost universal in public and leading private schools. Thus, it is hoped that the present volume may to some extent serve as a text-book without the severity of such a form. The best English and foreign authorities have been consulted, and other trustworthy sources—as papers read before scientific societies—drawn upon, bringing the information down to the latest time. Though these pages are designed for young persons, other readers, perhaps, who are not familiar with the subject, may find some interest in them if they are not deterred by the necessarily simple style.

"My thanks are due to Mr. H. B. Woodward, of the Geological Survey of England and Wales, for some valuable suggestions made during the progress of the work."

The work comprises the following divisions: the Vegetable Part, the Animal Part, and the Human Part, and is very fully illustrated by admirable engravings.

THE SENSES.

"The Senses." By W. Gadd, C.E., Hon. Sec. Scientific and Mechanical Society. A Paper read before the Scientific and Mechanical Society, Manchester, October 27th, 1876.

This is a very lucid essay on a subject which all must be interested in, and we regret that we have only space for the following passage, which will, perhaps, afford a general idea of the whole work.

"The question arises, are there then sounds, lights, tastes, scents, or other activities which, when brought in juxta-position with our organs of feeling, find no corresponding rate or quality of vibration, and so are impossible of our comprehension? Of this fact I have no doubt whatever; in fact, it has been clearly proved. Take, for example, the following facts with regard to sound:—the human ear, in the highest state of cultivation or development, is only capable of comprehending between eleven and twelve octaves of notes. This has been established by many beautiful experiments, and may be explained this way. Suppose a wire stretched to such a degree that when struck with the hammer it gives a note three octaves above the highest note in a modern piano. A very high and shrill note would be heard by all present. Now, please suppose it screwed three notes higher, very few of us present would hear it, the remainder would not hear any sound at all. We will now suppose the wire to be further tightened until, by counting the vibrations, we could tell that the note produced would be four notes still higher. Then the result to all of us would be the same as if the wire was not struck at all, and there would be, as far as we are concerned, silence. The same thing occurs as we go downward in the scale. In a similar way it may be shown that there are vibrations of taste, which the tongue or palate have not now the capacity to realize. With regard to sight, who has not proved the superiority of light over his capacity of reception, when he has tried to look at the sun? And though in this case it is sheer excess of force, or quantity, and is analogous to the effect on the ear of a contiguous explosion, still the great facts of spectrum analysis, on the one hand, and colour blindness on the other, lead us to the conception of forces and activities of which we have no sensation.

"We are thus brought clearly to comprehend that there are vast energies surrounding us, of which we can have no comprehension or sensibility. And why? Simply because we have no organs wherewith to feel them in any way, and thus convey the impression of their existence to our brain and consciousness; and further, it is probable that our brains have not the capacity of reception even if the organs existed.

"The result of this reasoning is, then, that all the different phenomena which we call seeing, hearing, smelling, tasting, and feeling, are dependent for their existence on the possession of the corresponding organ, by means of which they become known to us, or, so to say, created; in short, that they are so many subjective impressions, and not the objective realities we mostly have supposed them to be. I am free to confess this may sound startling. But let us examine it awhile, and to do so I will ask you to go back in your minds to what I had to say with regard to sound, and to reflect that if the vibration of the particles of atmosphere produce sound by striking or impinging upon the drum of the ear, that it is not sound till it *does* strike thereon, and that if there were *no ears in existence, there would be no sound*; and further if we had in lieu of ears, a new organ wherewith to feel that same vibration of the atmospheric particles, but in a different way, we should have apparently a new phenomenon created, although the operation or motion of those particles producing these results, would be exactly the same in both cases."

Mr. Gadd pursues a similar train of thought with regard to sight, making light *subjective* to the sense of *seeing* possessed by the eyes.

PATENT-LAW REFORM.

THE following petition has been circulated for signature by the Society of Arts. It is identical in terms with one that has already been presented to the Lord Chancellor by the Council of the Society:—"To the Right Honourable the Lord High Chancellor of Great Britain.—The humble petition of the undersigned, sheweth,—That under the provisions of the "Patent Law Amendment Act, 1852," the Lord Chancellor, the Master of the Rolls, and certain law officers of the Crown therein named, together with such other persons as Her Majesty the Queen should appoint, are made Commissioners of Patents, with full powers as therein specified, to conduct the business of granting letters patent for inventions, and to make regulations for the administration of the Patent-office. That up to the present time the provisions of the foregoing Act, authorising the appointment of one or more persons as Commissioners of Patents, in addition to the *ex-officio* Commissioners, have not been acted upon, no additional Commissioners, as contemplated by the Act, have been appointed, and thus the whole business of the Patent-office falls upon the *ex-officio* Commissioners, who are already overburdened with other important and heavy duties. Your Memorialists, while admitting that great improvement has been effected by the energy and zeal of those who have been employed in the office, desire respectfully to urge upon your lordship the importance of acting upon the provisions of the Act of 1852, and carrying it out in its integrity, by appointing such additional Commissioners as are contemplated by the Act. Your Memorialists venture to think that if such additional Commissioners were appointed, duly paid, and made responsible for the effective working of the Patent-law as it at present exists, a large amount of beneficial reform would be obtained, and many of the objections now made, if not all, would be got rid of without any further legislation, at all events for the present. Your Memorialists, therefore, humbly pray your Lordship to cause the provisions of the Act of 1852 to be put into force by the appointment of one or more additional Commissioners of Patents, to whom might be entrusted the fully carrying out of the duties of the office, and who should be responsible for the same, *and that no further legislation be attempted until after such Commissioners shall have been appointed*, and the system contemplated by the Act administered in its integrity."

A DIGESTED LIST OF APPLICATIONS FOR PATENTS will appear in future in the SCIENTIFIC REVIEW.

FOREIGN SCIENCE.

THERE has just been published in Paris, "Algues Marines (Marine Algæ)." J. B. Baillière et fils, Rue Hautefeuill. There is something quite new in this book. The tendency to present nature itself instead of mere pictures has gained a hold of M. F. Stenforth, a distinguished student, and he has appended to his work a large series of really beautiful illustrations of algæ, being the algæ themselves fixed in paper rather thicker than the ordinary pages. These algæ are exceedingly delicate, and great skill has been demonstrated in producing them in a permanent form. Each specimen is described at the bottom, *e.g.*, 77 Netophyllum brilliæ P.A.C.; 39 Griffithsia Coralina H.P.C.—the prettiest specimen, and very fairy-like it is. The author has had considerable facilities per the Minister of Instruction; and the scope of his work is to demonstrate the useful and artistic value of these plants. With the assistance of a little studio, organised on the sea-shore during ·1876, he applied 25,000 plants for illustration of the 500 examples mentioned in his volume, and an account of the fifty species fixed. These are all spring *algæ*. The cocalines, it seems, are found chiefly on sandy coasts. The work is of course in the French language, and is dated 1877.

"Exploration gèologique de la mer morte de la Palestine et de l'Idumeé is a folio book which embraces the observations made by the author during the scientific expedition of the Duke de Luynes, and is a description of the stratified terrains of Palestine, and that of the organised fossil bodies which they enclose; a study of the eruptive rocks and volcanic phenomena; vestiges of the prehistoric times; and a profound discussion of the questions which are attached to the origin, mode of formation, depression of the bed, greatest saltness and bituminous and hydro-thermal emanations. The author says the wise hydro-geologist, Abbe Richard, denies the first principles of stratification. There are it seems fossils and fossils.

In chemistry a practical guide has been produced to physical organolephe and chemical characteristics by P. H. Le Page (Asselin, Paris). This takes the form of a kind of scientific dictionary. Readers interested in proposing new preparations are specially directed to the article under sulphates.

We find, on being favoured with a glimpse at the shelves of some of the principal foreign booksellers, and under their information that there is scarcely any work worth mentioning on Physics so written as to be intelligible to both master and man. We noticed some months ago a similar state of things in regard to Mechanical Science; and gladly take the opportunity to recommend the matter for remedial action. While the publishers of Leipzig and Paris are boasting of a quantity of learned works in mental philosophy and kindred topics, machinery of different kinds and motive power do not obtain any notice.

An erudite Treatise on Anthropogeny has been produced at Leipzig. The forms of animals in relation to man are carefully considered and illustrated. We recommend the book, not on account of any theory, but because the subject is gone into with great care and to considerable depth.

THE NEEDLEMAKERS' COMPANY'S PRIZES.

THE Company of Needlemakers having determined to offer prizes by way of encouraging and developing the art of needlemaking in the neighbourhood of Redditch, in which locality this manufacture has been established for many years past, the court of the company appointed a special committee to arrange a scheme for that purpose, and to confer with some of the leading manufactures as to the most desirable mode of inducing competition in the respective processes necessary to the development of the art. A committee of manufacturers was selected from the manufacturing district, and the various details of the prize scheme were considered by it. The scheme of prizes sought to develop the art of needlemaking under three heads, for which prizes were offered; first, to encourage the introduction of labour-saving machines; secondly, to reward skill in handicraft; and lastly, to stimulate the inventive and reflective talent of the needlemaking locality in the neighbourhood of Redditch by means of prizes for essays in connection with the needle manufacture. It must be understood that there are not less than thirty distinct processes in the manufacture of a needle, many of them requiring great manual dexterity, and others very great care, intelligence, and discretion, on the part of the mechanics. With reference to labour-saving machines, none were submitted for competition; the conditions stated that they must have been originated since 1st January, 1875, and although a great deal of machinery has of late years been introduced with success into the manufacture, only one machine is known that would come within that stringent condition, and this was not entered. In the second section, "Improvement in any of the processes of sewing needle manufacture," four inventions were sent in. The judges awarded the first prize to Benjamin Hill, needle hardener, of Studley, for a pair of foot shears; and a second prize, consisting of one pound, from local sources, with a certificate of merit, to Richard Bennett, junior foreman, of Redditch, for a "Double Polishing Buff." Section No. 3, prizes for handicraft (tool making) produced, as might have been expected, the greatest number of competitors and the keenest competition. The prizes in this section were offered for the best specimens of tool and work for sewing needles and sewing-machine needles. The art of toolmaking has always been considered, in this and kindred trades, one requiring the greatest skill, and it will be readily understood that the delicate needles used in the manufacture of gloves and fine cambric sewing, whether by hand or by sewing machine, must be made from dies of the greatest nicety and finish; undoubtedly the toolmakers were much stimulated by the prize scheme and exhibition, and as a consequence, the merits of many of them became better known. In this section the judges awarded the principal prize to Charles Townsend, toolmaker, of Redditch. For sewing-machine needle tools the judges awarded the first prize to Jonah Warner, of Redditch. The prize for the best essay was not awarded; a second prize for an essay was given to W. Shrimpton. The exhibition, which attracted much attention, took place in the rooms of the School of Art, Redditch, on the 31st July, 1876.

THE LATE MRS. GRAY.

Last year the death of Dr. Gray, of the British Museum, had to be recorded, and now that of his widow has to be noticed. It took place on the 9th inst., she having reached the ripe age of ninety years. Through this long life she had with unwearied industry been occupied either in aiding her husband in his scientific work, or in independently pursuing some favourite study of her own. As an instance of her indefatigable industry, we may refer to the five volumes of etchings of "Figures of Molluscous Animals" (from 1857 to 1874), in which the number of specimens represented is something astounding. These etchings were privately published, and can scarcely have obtained the notice they deserve. Of marine algæ she was an ardent collector, and she took delight in presenting collections, made and arranged by herself, to schools throughout the country, with the desire to diffuse a taste for a subject in which she took infinite pleasure. Her own collection of algæ, which is extensive, is, by her directions, presented to the Museum of the University of Cambridge. Moreover, she arranged and mounted, as a labour of love, the greater part of the Cuming Collection of Shells preserved in the British Museum.—*Athenæum.*

GLEANINGS.

We extract from our contemporary, *Iron*, and other journals, the following:—

Quite a Mother Country.—We are now clothing, feeding, and lighting a large part of Europe, and we are not importing anything like an equal amount of merchandise from them.—*St. Louis Journal of Commerce.*

Nails.—There were 12,747,000 kegs of nails manufactured in the United States in 1875.

White-lead.—It is stated that there are thirty-one white-lead manufactories in the United States, sixteen of which are west, and fifteen east of the Alleghany mountains. There are six works running in Pittsburg.

Lake Superior Iron.—This year's business in the Lake Superior iron district has been fairly prosperous; nearly 900,000 tons of ore have been shipped from the district, which is a gain of 100,000 tons over last year. Prices have, as a rule, been remunerative to the mine-owners. Nearly all the mines will work during the winter.

England going to America.—English manufacturers are discussing coming to this country to establish branch factories, since the tariff renders competition impossible. They had better stay were they are. Business is not in the condition to warrant additional manufacturing at present, and American manufacturers are able to increase their producing facilities very largely if necessary. There are hardly a hundred factories in the country of any description that have been run to their full capacity the past year. — *Boston Journal of Commerce.*

The Iron Manufacture at Chicago.—The growth of iron manufacture in the west is well illustrated in the case of Chicago, which is situated remote not only from the iron mines, but also from coal suitable for the purpose. Of the ten Bessemer steel works in the United States two are located in Chicago, and of the 291,000 tons Bessemer steel rails made in the country last year, 85,000 tons, or nearly one-third of the entire amount, were made in Chicago. The iron industries have 200 establishments, employ 10,000 workmen and manufacture to the amount of 35,000,000 dols. annually.

Paved with Gold and Silver. — A *News* reporter recently took a handful of the gravel thrown up on Main-street in laying the new water-pipes, and had it assayed by Ross, the well-known assayer. The result was gold 2·25 dols.; silver 3·75 dols.; total, 6 dols. per ton. This sample was snatched at random from the long pile of *debris* thrown up from the trench at the side of the street, opposite the News office. Main-street being macadamized with low grade silver ore from the waste dumps of the mines, this assay is no matter of surprise. Better assays than that could easily be obtained from the middle of the street.—*Gold Hill News.*

Trade with Brazil.—Two projects for renewing direct trade with Brazil are on foot, as the result of Dom Pedro's visit last summer. One is entirely American, and proposes to start with four new iron ships, of not less than 2,000 tons, specially adapted to the Brazilian trade, and running between New York, the West Indies, Rio de Janeiro, and other southern ports. The projectors have Dom Pedro's assurance of a liberal subsidy from the Empire of Brazil. The other project is to establish an English line to the Upper Amazon, opening to commerce a great and rich province heretofore closed, or accessible with great difficulty.

Steam Travelling Crane at Chatham.—There is now in course of erection at the Gun Wharf at Chatham, a steam travelling crane, which will be capable of lifting from 10 to 15 tons, the use of which will much facilitate the lifting of the guns which are constantly being shipped and unshipped for vessels proceeding to sea or from those which have returned home.

Rights of Railroad Passengers.—A decision has just been given in Philadelphia reaffirming the principle that a railroad company is compelled to give a passenger a seat without extra cost to him in the Pullman car if all the other seats in the cars of the train are occupied. The suit was brought in the Court of Common Pleas by W. Barnet Le Van against the Pennsylvania Railroad Company, for damages for forcible ejection from one of the cars of the company on a stormy night at a point many miles from any human habitation, whereby the plaintiff was compelled to walk a great distance at the risk of his life in search of a place to rest and be secure from the inclemcy of the weather. The passenger had paid his fare to Philadelphia, exhibited his ticket to the conductor, and insisted that, as there were no unoccupied seats in the cars belonging to the company, he would occupy one in the Pullman palace car, in which there were a number of vacant places. Instead of providing the accommodation justly demanded the conductor selected a lonely point on the road, and there ejected the passenger causing him to undergo considerable hardship, trouble, and privation, and hence this action for damages was brought. After a lapse of six years the jury now award to Mr. Le Van damages amounting to 8,500 dollars.

Petroleum Famine in St. Petersburg.—Two St Petersburg merchnats bought up all petroleum (naptha) offered for sale at the last fair in Nishni-Novgorod, and thus control nearly the whole quantity of foreign and home petroleum in Russia. This operation renders kerosene almost a monopoly, and most fabulous prices can be demanded by the possessors. No less than 300,000 puds of petroleum are stored in their name at St. Petersburg. From Dec. 20th they fixed the price at 5 1-5th roubles for 40lb. This is in reality a calamity for the Russian capital, so blessed with long winter nights, and newspapers resound with bitter complaints.

The Company of Copper Miners in England.—A meeting of the shareholders of this company has refused an offer from Messrs. Shaw and Thomson, of Leadenhall-street, for the whole assets and property of the company. This concern went into liquidation last July. It had existed since 1691, when it was incorporated by royal Charter. The losses during the last few years have been enormous, and even now in the liquidator's hands the works are losing at the rate of £26,000 a year. The offer of Messrs. Shaw and Thomson was—(1) to pay the whole debts of the company, amounting to £40,000; (2) to pay the costs of liquidation; and (3) to pay the preference shareholders £3 per share, equivalent to a further sum of £35,000. The offer having been declined, the liquidator was instructed to keep the concern going and reduce as much as possible the expenses.

Canadian Cattle and Sheep. — The herd of sixty Canadian cattle, landed at Liverpool, recently, from the steamer "Dominion," were inspected on the following day by a large number of persons interested in the cattle trade, and were pronounced to be the finest specimens of Christmas beef ever shown by one owner. A pair of steers were purchased by a leading salesman for £100, for show. The present high price of mutton in England has led several Canadian shippers to make the experiment of importing live sheep from Canada, with what success may be implied from the fact that from the first importation six weeks ago no less than 2,000 have been landed, and the Allen mail steamer "Polynesian" landed 250 recently in excellent condition.

War Preparations.—Both Russia and Turkey have, for some time past, been sending large orders for small-arms and cartridges to America. A supply of Colt's rifle machinery has been sent to Russia, and is turning out large numbers of rifles for the use of the Russian army. The number already manufactured in Russia by machinery purchased by General Gortoff from Colt's Rifle company is estimated at three millions. Russia has also, during the past year, imported from another American firm 100,000 pistols. There has likewise been perfected in America what is now called the Russian cartridge—twenty millions of which have been made in Bridgport, Connecticut. Cartridge machinery has also been sent from America to Russia, and 400,000 cartridges are being manufactured daily at St. Petersburg and Moscow. The Turkish Government have entered into a contract with the Rhode Island Company for the supply of 800,000 Martini-Henry rifles, of which 250,000 have already been shipped, 100,000 more are ready for export, and materials for another 100,000 are on hand at the works.

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THE INVENTOR'S INSTITUTE,

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Past Presidents:

SIR DAVID BREWSTER, K.H., LL.D., F.R.S., &c., from the establishment of the INVENTORS' INSTITUTE, till his decease, February, 1868. LORD RICHARD GROSVENOR, M.P.

President, SIR ANTONIO BRADY.

SESSION 1875-76.

MEMBERS' MEETINGS AT 8.15 P.M.

Thursday, January 11th.—Mr. Hough's Invention for Raising Sunken Vessels, and Patent Law Conference.

Thursday, January 25th.—On Preventing Collisions at Sea by Helm Indicating Signals, by — Nickoll, Esq.

Executive Council Meetings same days at half-past 7 p.m.

Subscriptions are payable to Mr. G. A. STRETTON, the Receiver, 4, St. Martin's-place, S.W., who is the proper official to give receipts. F. W. CAMPIN, Sec.

N.B.—A movement for the REDUCTION OF PATENT STAMP DUTIES *is now on foot; those who wish to support it should at once communicate with the Secretary.*

Proceedings of the Institute.

THE Opening of the Fifteenth Session of the Inventors' Institute (1876-77), was inaugurated by the Inventors' Dinner, at St. James's Hall, on 30th November; the proceedings at which will be found in another column.

On the 14th December the Executive Council met, and was presided over by Dr. MCGRIGOR CROFT, when, after some ordinary general business had been transacted, the following resolution having reference to a representation made by the Society of Arts to the Lord Chancellor, that if some re-arrangements of the Government Patent Office were made, no further Patent Reforms were needed, was moved by Mr. T. PATERSON and seconded by Mr. A. J. MURRAY, and passed unanimously:—"That the better organization of the Government Patent Office as constituted under existing Acts of Parliament, and the most efficient working out of such Acts cannot prove even a temporary measure of settlement of the Patent Question, since (amongst other important matters) the same will leave untouched the essential point of the Reduction of the cost of Patents, now urgently required." This was ordered to be transmitted to the Lord Chancellor, and other action taken therein.

MEMBERS' MEETING, 14TH DEC., 1876.—Exposition of Inventions.—At this meeting several important inventions were submitted to the consideration of the members and friends then present. The first of these was MAJOR WELDON'S invention of a range or distance finder. This was very fully explained by Mr. T. Morgan, but as in consequence of some further improvements not being completely patented, we are not able to place the invention before our readers in its most valuable form, we refrain from giving any *expository report at present.*

Mr. Bacon's invention of improvements in magic lanterns, for the use of opaque photographs instead of transparent slides, was the second invention submitted to the meeting. This was considered to be a most noteworthy invention, and we shall endeavour to supply full information at an early date.

A bottle-stopper by Mr. Michell, of Truro, Cornwall, and casters by Messrs. Ashenhurst, were exhibited and received general approval; as was Mr. Calley's invention for lowering ships' boats which has already been fully described in the SCIENTIFIC REVIEW.

Monthly Notices.

Profs. Henry E. Roscoe, F.R.S., and Carl Schorlemmer, F.R.S., of the Owens College, Manchester, have in the press a Treatise on Chemistry, which it is hoped may serve as a work on Chemical Science for those who are not content with a merely elementary knowledge. Though obliged, by the aim which they had in view, to omit certain subjects usually treated in works on Chemistry, especially those included under the term Chemical Physics, the authors have endeavoured to give as complete an account as possible of purely chemical phenomena, and a description of the chief chemical processes. The first volume of this work—containing (1) Historical Introduction, (2) General Introduction to the Science, (3) Chemistry of the Non-metallic Elements and their Compounds, (4) Crystallography, and (5) Spectrum Analysis—will be published in January by Messrs. Macmillan and Co.

Selenium is the subject of a "Report on the Allotropism of Selenium, and on the Influence of Light on the Conductivity of this Element," by H. N. Draper and R. J. Moss, given in the *Transactions* of the Royal Irish Academy. The conducting powers of this curious metal are, it appears, materially influenced by the weakest action of obscure (heat) radiations, consequently its conductivity is due to physical changes in the metal itself, and not, as has been thought, to gases or vapours occluded in it.

Naphtha is used as fuel for the Russian flotilla in the Caspian Sea. It is obtained from the ever-burning springs of Bakon. The experimental result is said to be so satisfactory, that the boilers of four other vessels are being altered to adapt them for burning this mineral oil.

The Journal of the Society of Telegraph Engineers, published quarterly, which includes original communications on telegraphy and electrical science, edited by Major Frank Bolton and J. Sivewright, has in its last part (XI) some very important articles.

The Journal of the Iron and Steel Institute, edited by Jno. Jones, F.G.S., and David Forbes, F.R.S., which is published half-yearly, is worthy of perusal as conveying information on the important subject of iron and steel manufacture.

On the evening of Friday, the 15th, the fourth annual dinner of the Royal School of Mines was held at the Pall Mall Restaurant. On this occasion the students of the School presented Professor Ramsay with a handsome silver *étagère* and two side *plateaux*, on the occasion of his retirement from the Professorship of Geology, which he has held since the opening of the School in 1851.

Nitroglycerine.—Some of the physical characteristics of this body have recently been examined by C. Beckerhinn. He has determined the heat of fusion of the frozen body, and finds it to be 33·54 units of heat. The density of liquid nitroglycerine is 1·599; that of the solid 1·735. He refers to the opinion generally held, that the compound when frozen explodes more readily than when it is in the liquid state. Experience does not support this view, and it must be evident, on theoretical grounds, that it is highly improbable, since a considerable amount of heat must be consumed in causing a change in the state of aggregation before any explosion can ensue. To decide the question the author constructed an apparatus for the explosion, by percussion by the fall of a weight, of nitroglycerine, both solid and liquid, and he has found that while the liquid detonated when the weight fell from a height of 0·78 metre, solid nitroglycerine did not explode till the weight fell through a distance of 2·13 metres.

The Centennial Exhibition was open 159 days. During that time the paid admissions were 8,004,325. The free admissions were 1,785,053. Total admissions, 9,789,392. The total receipts for admission were 3,813,740 dols. 75c.; average daily total admissions were 61,558. The average daily receipts were 23,935 dols. 85c. The Vienna Exhibition had a total attendance of 6,740,500, of which only 3,492,622 were cash admissions, amounting to 1,032,388 dols. The whole number of all kinds who attended the London Exhibition of 1851 was 6,039,195. The aggregate admission of all kinds attending the Paris Exhibition of 1855 were 5,162,330. The aggregate number of all kinds attending the London Exhibition of 1862 was 6,211,103. At the Paris Exhibition of 1867 the whole number of admissions of all kinds was 8,805,969.

Proceedings of Societies.

ROYAL SOCIETY.

NOVEMBER 23RD.—Dr. Hooker, C.B., President, in the chair.—Mr. Croll and Prof. Thorpe were admitted into the Society. The following papers were read: "On the Influence of Geological Changes on the Earth's Axis of Rotation," by Mr. G. H. Darwin,—and "On the Structure and Development of the Skull of the Urodelous Amphibia," Part I., by Prof. Parker.

November 30th.—Anniversary Meeting.—The President delivered an address, in which the Fellows were made aware of the large amount and importance of the work which, on behalf of the Society, had been transacted by the Council during the year. "We have been called upon more frequently than ever," said Dr. Hooker, "to aid in giving effect to those effects for the advancement of natural knowledge which, whether originating in private enterprise or in the Councils of the State, have marked the year as a memorable one in the history of science." This exordium was borne out by the topics of the address:—The printing of the "Catalogue of Scientific Papers for the decade 1864-1873," by a grant from the Treasury, as in the case of the first six volumes, the impending publication of the Reports of the Naturalists attached to the Transit of Venus Expeditions to Rodriguez and Kerguelen Islands, and of the Eclipse Expedition to Siam,—the augmentation of the Society's pecuniary resources by the Dircks bequest, the Carrington bequest, and the interim bestowal of the proceeds of the Jodrell fund,—the formation of another Trust Fund by investment of the long-pending Handley bequest,—Mr. Jodrell's munificent gift of £6,000, which remains on hand until some eminently suitable occasion shall arise for its appropriation,—the proposition made on the part of Government by the Lord President of the Council, to supplement the existing Government grant by a further grant of £4,000 yearly, during five years, by way of experiment,—the action of the Council of the Society in regard to the Cruelty to Animals Bill,—the Society's contribution to the Loan Collection of Scientific Instruments, and the way in which an instructive result form the collection may be provided for,—the best method of increasing the scientfic efficiency and public interest of the Meteorological Office, the voyage of the Challenger, and the Arctic Expedition, Many of these topics are pregnant with important consequences, which, as the address will shortly be in the hands of the Fellows, will doubtless be foreseen and worthily entertained.

December 7th.—Dr. Hooker, President, in the chair.—The following papers were read: "On a New Form of the Sprengel Air-pump," by Mr. C. H. Gimingham,—and "On the Diurnal Variations of the Wind and Barometric Pressure, by Mr. F. Chambers.

December 14th.—Dr. Hooker, President, in the chair.—The following Papers were read: "On the Mechanical Effects and on the Electrical Disturbance consequent on Excitation of the Leaf of *Dionœa muscipula*," by Dr. Burdon Sanderson and Mr. F. J. M. Page,—"On the Electro-motive Properties of Muscle," by Dr. Sanderson,—"Preliminary Notice of Investigations on the Action of the Vaso-Motor Nerves of Striated Muscle," by Mr. W. H. Gaskell,—and "Note on the Photographic Spectra of Stars," by Mr. W. Huggins.

ROYAL INSTITUTION.

DECEMBER 4TH.—Sir T. F. Elliot, V.P., in the chair.—Major J. F. D. Donnelly, Mrs. L. E. J. Elwes, Mrs. Tyndall, Messrs. E. Herries, F. J. Horniman, S. Joshua, W. C. Pickersgill, E. W. Roberts, H. B. Smith, and S. Thompson were elected Members.

SOCIETY OF ARTS.

NOVEMBER 27.—R. Rawlinson, Esq., in the chair. Ten new Members were proposed for election. The paper read was by General F. C. Cotton, "On the Construction of House Drains."

DECEMBER 6TH.—R. Rawlinson, Esq., in the chair.—Fourteen new Members were proposed for election.—The discussion on General Cotton's paper, "On House Drainage," was continued.

December 13th.—General F. C. Cotton in the chair.—Twelve new Members were proposed for election. The paper read was, "On a New Process for Printing a Number of Colours at One Time," by Mr. E. Meyerstein. The process consists in printing from a block of the colour itself, constructed by adding small quantities of the required colours in succession, parting down the colour to the outline required as each successive amount is added. The name given to the process by the inventor is "Stenochromy." A number of copies, reproductions both of oil and water colour paintings, were exhibited.

December 20th.—Lord Alfred S. Churchhill in the chair.—Four new Members were proposed for election. The paper read was "On the Philadelphia Exhibition by Prof. Archer.

INSTITUTION OF CIVIL ENGINEERS.

NOVEMBER 28.—Mr. G. R. Stephenson, President, in the chair. The paper read was "On the Chalk Water System," by Mr. J. Lucas.

DECEMBER 5TH.—Mr. G. R. Stephenson, President, in the chair.—The first ballot of the session resulted in the election of forty-six Candidates, of whom nine were Members, viz: Messrs. W. Carson, T. R. Firth, H. Garbett, W. Inglis, J. Kitson, jun., J. Napier, W. M. Roberts, R. Robinson, and F. T. G. Walton; and thirty-seven were Associates, viz., Messrs. W. Ashdown, T. Bevington, A. F. Borradaile, H. T. Bovey, C. F. Call, S. Cooke, M.A., J. Corbett, M.P., D. Cowan, G. N. Cox, R. Davidson, B. P. Ellis, C. S. F. Fagan, M. F. Fitzgerald, W. H. Gibbs, J. G. H. Glass, T. G. Gribble, J. Hayes, W. S. Hedgman, T. Hewson, J. A. R. Hildebrandt, W. Hume, J. C. Inglis, J. W. James, O. Jones, W. G. Kerle, L. Lloyd, H. E. MacMahon, W. F. Mayes, N. Outine, C. P. Sheibner, F. Slade. C. H. Sparkes, T. L. Tanner, W. Thomas, T. D. Welsh, J. H. Wicksteed, and G. N. Yourdi. The discussion upon Mr. Joseph Lucas's paper, "Qn the Chalk Water System," was continued throughont the evening.

December 19th.—*Annual Meeting.*—Mr. G. R. Stephenson, President, in the chair. The Report of the Council was read. The Report having been, after considerable discussion, adopted, the premiums and prizes (awarded at the close of last session) were presented by the President. The following gentlemen were elected as the new Council:—G. R. Stephenson, President; J. Abernethy, Sir W. G. Armstrong, W. H. Barlow, and J. F. Bateman, Vice-Presidents; Sir J. W. Bazalgette, I. L. Bell, M.P., G. Berkley, F. J. Bramwell, G. B. Bruce, J. Brunlees, Sir J. Coode, H. Hayter, W. Pole, C. W. Siemens, Sir J. Whitworth, Bart., and E. Woods, Members; and Col. G. C. Collyer, H. Oakly, and Col. J. T. Smith, Associates.

SOCIETY OF ENGINEERS.

DECEMBER 4TH.—Mr. V. Pendred, President, in the chair.—A paper, by Mr. W. M'Naught, "On the Rolling of Ships," was read by the Secretary.

CHEMICAL SOCIETY.

DECEMBER 7TH.—Dr. J. H. Gladstone, V.P., in the chair.—Prof. A. H. Church reada paper, "On Colein," the red colouring matter existing in the leaves and stems of the *Coleus vershaffellii*. It was prepared from the stems, and when pure is an amorphous substance of a brilliant crimson colour, unalterable by exposure to light or by the action of dilute acids; alkalis, however, alter it rapidly. Its alcoholic solution when freshly prepared is of a bright red colour, but, in common with that of some other red colouring-matters, it rapidly fades until it becomes almost colourless. This is due to a combination of the colein with the alchohol, the red colour being immediately restored on on the addition of a little acid. Dr. Otto Witt made a verbal communication, "On Phenylene-diamine," obtained from dintro-benzene by the action of reducing agents. The Secretary read a paper, by Mr. J. B. Hanna, "On Calcium Sulphate," describing some double salts, and some of the hydrates. The last paper was "Additions Notes on Potassium Tri-iodide," by Mr. G. S, Johnson, giving the specific gravity and atomic volume of the substance.

PHYSICAL SOCIETY.

DECEMBER 2ND.—Prof. G. C. Foster, President, in the chair.—Mr. G. Waldemar von Tunzelmann was elected a Member.—M. Jansseu made a brief communication, in French, with reference to a method which he has proposed to the Académie des Sciences for ascertaining whether planets really exist between Mercury and the Sun. After mentioning the importance of photography from an astronomical point of view, he explained his reasons for hoping that a series of solar photographs, taken regularly at intervals of about two hours, at a number of places on the earth's surface, would enable us to determine this question.—Mr. Crookes showed the spectrum of a small specimen of chloride of gallium, which he had received from its discoverer, M. le Coque de Boisbaudran. The discovery of this metal is of peculiar interest, as M. Mendelief had previously, from theoretical consideratious, asserted it to exist, and had also correctly given some of its chemical and physical properties. The most prominent line in the spectrum was a bright line in the blue, somewhat more refrangible than that of indium.—Mr. Lodge described a model which he has designed to illustrate flow of electricity, &c., and he showed how similar considerations can be applied in the case of thermo-electric currents.

December 16th.—Prof. G. C. Foster, President, in the chair.—Mr. W. Baily was elected a Member.—Mr. Crookes described some of the most recent results he has obtained in his experiments on the radiometer, and exhibited many beautiful forms of the apparatus, most of which have been devised with a view to decide on the correct theory of the instrument. He commenced by describing the arrangement he has used for some time past in studying the resistance offered by air and other gases to the rotation of a mica disc. From the normal atmospheric pressure to the best vacuum which can be obtained by the ordinary air-pump, the resistance remains nearly constant; and these experiments have been carried on in vacua of remarkable perfection, the highest exhaustion obtained being represented by one millimètre on a scale of ten miles—a point which was attained by means of a Sprengel pump, with improvements by Mr. Gimingham, and measured by a M'Leod gauge. Mr. Crookes concludes that in a perfect vacuum a mica plate would not continue to oscillate for ever—a fact probably due to the viscosity of the glass fibre. About fifteen different forms of the radiometer were exhibited, and their inventor has satisfied himself that the theory of their action, proposed by Mr. G. J. Stoney is the only one capable of completely accounting for their action, and he considers it to be, in all probabslity, the correct one. As, on the molecular-movement theory, the rotation is due to a throwing-off of particles from the backened surface of the mica, it follows that, if a piece of transparent mica be attached to each fly in front of the backened surface, the rotation will take place in the opposite direction; and this proved, on experiment, to be the case. As these facts can be explained on the "molecular movement" or the "evaporation and condensation" theory, Mr. Crookes arranged a radiometer, having four transparent mica vanes, and mounted in a rather large bulb. At the side of the bulb, in a vertical plane, a plate of mica, blackened on one side, is so fixed that the vanes can pass, and when light shines on this fixed plate the fly is found to rotate – a fact which in itself disproves the latter theory. In conclusion, he exhibited a photometric four-vaned radiometer, in which the fly was attached to a small magnetic needle, and this might be so checked by an external magnet that the strongest light would be incapable of causing the needle and vanes to make a half-rotation. If the circumference of the globe be graduated, and the apparatus be brought within the influence of a source of light, the angle to which the needle is deflected will be a direct measure of the intensity of the light.—Prof Dewar exhibited a simple electrometer, which he has designed, founded on the discovery of Leipman that the capillary constant is not really independent of the temperature or condition of the surface, but is a function of the electromotive force.

ZOOLOGICAL SOCIETY.

NOVEMBER 21ST.—Prof. Flower, V.P., in the chair.—The Secretary read a Report on the additions made to the Menagerie during October. Mr. Sclater exhibited and made remarks on the skin of a young Rhinoceros (*R. sondaicus*), from the Sunderbunds, near Calcutta, and exhibited a drawing of an *Emys Hamiltoni*, lately captured at Futtehgurh (Ganges). The occurrence of this Emys so far west as Futtehgurh was considered as of much interest. Letters and papers were read: from Count T. Salvadori, "On some of the Birds mentioned by Signor D'Albertis, as seen by him during his first Excursion up the Fly River;" from Mr. G. B. Sowerby, jun., "On six new Species of Shells, from the Collections of the Marchioness Paulucci and Dr. Prevost;" by Mr. E. R. Alston, "On two new Species of Hesperomys from Central America, which he proposed to call respectively *Hesperomys teguina* and *H. couesi*;" by Prof. Garrod, "On the Chinese Deer, named *Lophotragus michianus* by Mr. Swinhoe," in which he showed that the species so called was identical with *Elaphodus cephalophus* (A. Milne-Edwards), obtained by Père David in Moupin: the close affinity between the genera Elaphodus and Cervulus was demonstrated, the latter differing little more than in the possession of frontal cutaneous glands not found in the former; by Mr. A. G. Butler, "On new Species of Lepidoptera, from New Guinea, with a notice of a new Genus;" and from Dr. J. S. Bowerbank, being the eighth of his series of "Contributions to a General History of the Spongiadæ."

Dec. 5th.—Dr. E. Hamilton, V.P., in the chair. The Secretary read a Report on the additions made to the Menagerie during November, and called particular attention to four Brazilian Cormorants (*Phalacrocorax Brasilianus*), purchased, and a Hooded Crane (*Grus monachus*), received on deposit. Letters and communications were read: from Count T. Salvadori, announcing that a new species of Paradise-bird, of the genus Drepanornis, had been discovered near the most inland point of Geelvink Bay, New Guinea,—from Mr. A. Anderson, containing some corrections of and additions to previous papers "On the Raptorial Birds of North-Western India,—by Mr. F. Day, "On the Fishes collected by the Yarkand Mission, in 1873," to which the late Dr. Stoliczka was attached as naturalist: the paper gave an outline sketch of the Fresh-water Fishes of Hindustan, Afghanistan, Western Turkestan, Yarkand, Tibet, and Cashmere; the author showed that the principal fishes of Yarkand belong to a local group of Carps, termed, "Hill Barbels, or Schizothoracinæ," by M'Clelland; that this group is almost restricted to cold and elevated regions, spreading to the most eastern portion of Western Turkestan, Afghanistan, and along the slopes of the Himalayas to China; and that these forms are entirely distinct from the Carps of the plains to the south of the Himalayas,—from Mr. M. Jacoby, "On new Genera and Species of Phytophagous Coleoptera,—from Dr. A. Günther, "On a new Species of Lizard from Asia Minor," which he proposed to name *Zootoca Danfordi*, after Mr. C. G. Danford, its discoverer,—from Mr. W. Ferguson, of Colombo, "On a new Species of Snake, of the genus Aspidura, from Ceylon, for which the name of *A Guentheri* was proposed.

LINNEAN SOCIETY.

NOVEMBER 16TH.—Prof. Allman, President, in the chair.—Messrs. J. C. Oman, R. H. Peck, and D. G. Rutherford were elected Fellows.—Mr. H. N. Moseley read a paper "On the Flora of Marion Island." From its isolation, this island possesses considerable interest to naturalists, for although the Falklands are some 4,500 miles distant, plants found there are also found on Marion Island. The author attributes this to the prevalent winds, antarctic drift, and the transport of seeds by the sea-birds. Marion Island appears to be of volcanic origin, and has snow-clad mountain summits. The rocks at half tide are covered with *Darvillea utilis*; above high tide *Tillæa moschata* is found in abundance; and beyond the beach a swampy peaty soil covers the rocks, where there is a thick growth of herbage. This is principally composed of species of Acæna, Azorella, and Festuca: the first of these is the most abundant plant on the island. *Pringlea antiscorbutica* is not so plentiful as at Kerguelen Island. Species of Ranunculus, Stellaria, Cerastium, &c., were gathered, and among ferns four, whereof *Lomaria Alpina* was most frequent. Lichens are sparse, but not so mosses, which form great yellow patches, contrasting with the more prevalent green vegetation. Mr. Moseley is inclined to the opinion that there has been a land connection at one time between Marion Island, the Crozets, and Kerguelen Island. A memoir, "On the Birds collected by Prof. Steere (Michigan, U.S.) in the Philippine Archipelago," was read by Mr. R. Bowdler Sharpe, and drawings of new forms shown. Those hitherto unrecorded and now described are sixty new species, certainly a large number of novelties from islands whose Avifauna has but recently been made the subject of a monograph by the Marquis of Tweeddale. A letter, containing observations on the American grasshopper, *Caloptenus femurrubrum*, with remarks on the same by Mr. F. Smith, was noticed. Plants, in illustration of Mr. Moseley's paper, and curious Japanese treatises on botany, gardening, and zoology, with drawings, were commented on.

December 7th.—G. Bentham, V.P., in the chair.—Mr. F. Day read Part I. of the "Geographical Distribution of the Freshwater Fishes of India." This contribution aims towards solving the vexed question of whether the fauna of Hindostan is mostly African on Malayan. The author first separates the true freshwater species from those which enter rivers from the sea for breeding or predacious purposes. Out of nine families of spiny-rayed fish (Acanthopterygians), only two are likewise found in the African region; but one of these is in Madagascar, which is doubtfully African; the other is also found in the Malay Archipelago, which possesses representatives of eight out of nine families. Each of the forty-five species is then followed out, and the author considers that the Indian and Malayan fauna (of the group in question) are essentially identical, whereas the species are scarcely represented in Africa. The freshwater fishes of Ceylon, the Andamans, and Nicobars, he believes, are also strictly Indian, whilst, as these fishes cannot be spread except by line of freshwater communication, it appears necessary and most probable that these islands were at one period connected to the continent of India. Moreover, certain forms exist in Malabar, which are absent from the rest of India, but re-appear in the regions of Chittagong or Siam. Mr. J. S. Baker gave the substance of an exhaustive memoir, "On a General Systematic Arrangement of the Iridaceæ" (the Iris family). Nearly all the Iridaceæ inhabit temperate regions, and may be grown successfully in the open air in this country. Some are among our most familiar garden genera; for instance, Crocus, Iris, and Gladiolus. About 700 species and 65 genera are now recognized. In his classification the structure of the perianth guides him to three primary divisions—respectively the (1) Ixieæ, (2) Irideæ, and (3) Gladioleæ,—the familiar garden genera above given serving as typical examples. These three divisions are again subdivided into—(a) those having *bulbs with free stamens*; (b) those having *bulbs with monadelphous stamens*; (c) those *wanting bulbs, but with free stamens*; (d) those *devoid of bulbs with monadelphous stamens*. As regards distribution, 312 genera are found at the Cape, in Europe and North Africa 94, temperate Asia 89, tropical American 82, tropical Africa 56, South America 34, Australia 31, temperate North America 25, and Polynesia 1. The Rev. W. A. Leighton communicated a description of 11 new British Lichens; 7 of these belonging to the genus Lecidea, 1 to Odontotrema, and 3 to Verrucaria.

ROYAL SOCIETY OF LITERATURE.

NOVEMBER 22ND.—Sir P. Colquhoun, V.P., in the chair.—Mr. W. D. Gray Birch read a paper upon two Anglo-Saxon manuscripts in the British Museum, numbered as Cotton, Titus D. xvvi, xxvii. In the course of his account Mr. Birch traced the compilation of these two interesting relics of ancient literature to be the work of Ælfwine, Abbot of Newminster, Winchester, in the early years of the eleventh century, and illustrated the various astronomical, ecclesiastical, and literary contents of the volumes, their art and history, with numerous extracts and notes from manuscripts of corresponding antiquity and contents.

ASTRONOMICAL SOCIETY.

DECEMBER 8TH.—W. Huggins, D.C.L., President, in the chair.—Father Perry read a paper "On some Experiments made by M. André upon the Effect of Difraction on the Image of a uniformly bright Object as seen in a Telescope." He had attempted to determine theoretically the amount of difraction, and the consequent magnitude of the black drop as seen at any portion of the field of view. On making experiments on a modal of the transit of Venus, illuminated by a lime-light, he found that the observed magnitude of the black-drop corresponded very exactly with the intensity of the theoretical difraction. Father Perry also drew attention to M. Janssen's observations of the body of Venus as seen projected on the corona before first contact, by means of a screen of coloured glass, which permitted the rays from the corona to pass, while it blotted out the illumination of the atmosphere. Mr. Ranyard said that it seemed doubtful whether M. Janssen had really seen the body of the planet projected on the corona, or whether he had only seen what other observers had described as the body of the planet marked out by a faint ring of light. It seems certain that the dark body of the moon cannot be seen projected on the corona during a partial eclipse, and during a transit of Venus the illumination of the atmosphere is more intense than during a partial eclipse. It seems also that a blue glass, such as that used by M. Janssen, would not transmit the rays of the corona, which consist mainly of a green line, together with a faint continuous spectrum. Mr. Huggins showed an enlarged drawing of a photograph of the spectrum of Vega, which he had recently obtained. The spectrum of the star appeared upon the photographic plate as a streak about half an inch long, but the lines were so sharply defined that the spectrum could be examined with a microscope, and in a reference solar spectrum, which had been taken on the same scale alongside the stellar spectrum, many lines can be detected between the two H lines. The photograph spectrum shows lines far beyond the violet end of the spectrum, as seen by the eye. Mr. Christie read a paper "On the Gradation of Light on the Disc of Venus." He thought that his observations tended to prove that the light of the sun suffers specular reflection at the surface of the planet. Mr. Neison read a short paper to show that similar effects of illumination might be expected if the surface of the planet were rough, like that of the moon. Mr. Marth drew attention to the importance of making accurate observations, during the present year, of the position of the companion of *α* Centauri. He showed a diagram giving the position of the companion star as observed during the last fifty years. From this it appeared that the small star is now at or near its periasteon, and is consequently moving with great rapidity. He remarked that, owing to the great parallax of *α* Centauri, the importance of obtaining observations of the position of the companion at the present time, and of fully determining its orbit, cannot be exaggerated.

GEOLOGICAL SOCIETY.

November 22nd.—Prof. P. M. Duncan, President, in the chair.—Messrs. R. Mitchell and A. H. S. White were elected Fellows. The following communications were read: "On the Pre-Cambrian (or Dimetian) Rocks of St. Davids," by Mr. H. Hicks,—and "On the Fossil Vertebrates of Spain, by Prof. S. Calderon.

December 6th.—Prof. P. M. Duncan, President, in the chair.—The Rev. G. Middleton, Messrs. T. Collinson, P. L. Galloway, S. H. Needham, M. W. Peace, N. F. Robarts, and J. Stirling, were elected Fellows. The President announced the sad loss the Society had sustained in the death of Mr. D. Forbes, one of its Secretaries, which took places on the morning of December 5th. The paper read was, "On the Intrusive Character of the Whin Sill of Northumberland," by Mr. W. Topley.

ASIATIC SOCIETY.

December 11th.—Sir E. Colebrooke, Bart., in the chair.—The Earl of Northbrook, Mr. W. H. Rylands, and Dr. Birdwood were elected Resident, and Mr. E. Schuyler non-Resident, Members. The Secretary read a Report on the Inscriptions recently procured by Dr. P. Goldschmidt in the North-central Province of Ceylon.

GEOGRAPHICAL SOCIETY.

December 12th.—H.R.H. the Prince of Wales, Vice-Patron, in the chair.—The following gentlemen were elected Fellows: Right Hon. Sir B. Brett, Sir J. Hawkshaw, Hon. H. Tollemache, Major-General H. E. Longden, Lieut. T. A. Fox, Lieut. T. G. Murray, Surgeon-Major A. F. Bradshaw, Rev. J. Hawkins, Rev. D. S. M'Clean, Rev. C. J. Ridgeway, Rev. M. C. T. Sturman, Dr. D. Macfarlane, Messrs. D. A. Aird, R. A. Brooks, A. C. P. Coote, H. Dore, J. T. Fitz-Adam, A. Gray, J. Grierson, R. Headley, T. Horsley, J. P. Joaquim, A. W. Lafone, B. W. Levy, J. C. Mappin, G. Mathews, J. G. Meiggs, F. Mortimore, F. Normanby, W. N. Rudge, T. Russell, G. Sibley, J. D. Steele, H. Stewart, W. Tufnel, C. C. Williams, J. Williams. The papers read were: "On the North Circumpolar Sea," by Capt. Sir G. S. Nares,—"Arctic Winter Experiences," by Capt. H. F. Stepenson,—and "Sledge Journey towards the Pole," by Capt. A. H. Markham.

MICROSCOPICAL SOCIETY.

Dec. 6th.—H. C. Sorby, Esq., President, in the chair. A number of donations were announced and acknowledged, and Mr. W. G. Lettsom was elected a Fellow. The President exhibited a fac-simile of Jansen's microscope, made, by permission of the Dutch Government, from the original, exhibited at the South Kensington Loan Collection. A paper, by the Rev. W. H. Dallinger, was read by the Secretary, "On *Navicula Crassinervis*, *Frustulia Saxonica*, and *Navicula Rhomboides*," in which, after referring at some length to the recent discussion upon the subject of their identity or difference, he expressed his belief that they were all specimens of Rhomboides, differing only as to size; and in support of this opinion a number of beautifully executed drawings were exhibited, showing the microscopical appearance of the diatoms in question under a magnifying power of 800 diameters. A discussion followed, in which the President, Mr. Slack, Dr. Wallich, and Mr. Ingpen took part, in the course of which it was pointed out that, although the striæ on all the specimens were resolvable in the same way, and differed merely as to size, yet there were, even in the drawings submitted, differences sufficient to be considered specific.

BRITISH ARCHÆOLOGICAL ASSOCIATION.

December 6th.—The Rev. S. M. Mayhew, in the chair.—The Chairman exhibed several objects of interest found recently at Moorfields, and among these were two shepherds' crooks of Saxon date in fine preservation. Several examples of early (Norman) pottery were exhibited in fine preservation. Mr. Syer Cuming spoke of the early relics which had from time to time been exhumed at Moorfields, and described several of prehistorical date which had been met with in Long Alley. Mrs. Baily sent for exhibition several curious iron fetters and instruments of torture. Mr. Isaacs exhibited a Romano-British drinking-cup, of a material not unlike Upchurch ware, found at Southfleet. Mr. L. Brock described a collection of personal ornaments, mostly of Roman date, found in London, and Mr. Cuming identified some of the beads exhibed as of Egyptian manufacture for Roman use. Dr. R. N. Philipps exhibited some curious carvings, part probably of an ornamental distaff, and recently found at Guelderland, New Holland. They were identified as being of German workmanship, and were probably brought to England by some of the Flemish settlers in the sixteenth century. Mr. J. Brent read a paper "On Ancient Crnterbury." He remarked upon the small amount of work of Roman date now above ground, the Roman level being about eight feet below that of the modern city. He adduced carefully collected evidence in proof of the small extent of the original Roman settlement, and challenged the statements lately made as to the existence of a large lake on the west side of the city, and showed, from recent discoveries, that this never existed. The lecturer exhibited a large collection of Roman ornaments, mostly of bronze, some being enamelled and inlaid, and also many examples of pre-historic flint implements.

ANTHROPOLOGICAL INSTITUTE.

December 11th.—Col. L. Fox, President, in the chair.—The following new Members were announced: Rev. A. H. Sayce, Messrs. G. Tippetts and T. F. Peacock. The following paper, by Mr. H. H. Howarth, was read, "On the Ethnology of the Germans: Part I. The Saxons of Lower Saxony." The author contended that the Saxons north of the Elbe were immigrants, and of the same race as those south of that river, and that the Saxons were not indigenous to Hanover or Westphalia, but colonists or invaders. This he proved by the topography of those districts and by the names of men, things, &c. He pointed out also the strong differences between the Old Saxons and the Saxons who invaded England. He referred to Spruner's historical atlas for the definition of the ancient limits of the Saxon peoples. A paper on the Javanese, by M. Kiehl, was also read.

PSYCHOLOGICAL SOCIETY.

December 2nd.—Mr. Serjeant Cox, President, in the chair. Mr. Crome was elected an honorary member. The President reported a remarkable case of supersensuous perception. A paper, by Mr. Valtner, "On the Phenomena of Hypnotism," was read by the Secretary. A discussion followed, and was adjourned.

MATHEMATICAL SOCIETY.

December 14th.—Lord Rayleigh, President, in the chair. Mr. R. F. Davis and Mr. H. Weston were elected Members. The following communications were made: "On the Conditions of Perpendicularity in a Parallelepipedal System," by Prof. H. J. Smith. "On the Condition for the Existence of a Surface cutting at Right Angles a given Set of Lines," by Prof. Cayley. "The Orthogonal Transformation, and additions to former Paper on Transformation of Elliptic Functions," by Prof. Clifford. "On the Simplest Continuous Manifoldness of Two Dimensions and of Finite Extents," by Mr. F. W. Frankland. "On the Theory of Electric Images, and its application to the case of Two Charged Spherical Conductors placed opposite one another," by Mr. W. D. Niven. "On Viscous Fluids and Quaternion Forms of some General Propositions in Fluid Motion," by Mr. J. G. Butcher, and "An Easy Method of Finding the Invariant Equation expressing any Poristic Relation between Two Conics," by Prof. Wolstenholme.

HISTORICAL SOCIETY.

December 14th.—M. Moggridge, Esq., in the chair. Dr. G. Harris read a paper "On Domestic Every-day Life, Manners, and Customs in this Country, from the coming of the Anglo-Saxons to the Norman Conquest." The Rev. W. H. Wratislaw read a paper "On the History of the Counts of Cilly."

SOCIETY OF BIBLICAL ARCHÆOLOGY.

December 5th.—Dr. S. Birch, President, in the chair.—The new list of Officers and Council for the Session of 1876-7 was submitted for nomination by the Secretary. The following papers were read: "On some Recent Discoveries at Aboo-Simbel," by Miss A. B. Edwards,—"On the Baylonian Cylinders discovered by General di Cesnola in the Treasury of Kurium," by the Rev. A. H. Sayce, M.A.,—"Notes on Assyrian History," by W. St. Chad Boscawen: the author intends to continue his researches in the history of Assyria in a series of papers, of which this paper is the first,—and "On an Aramæan Seal," by Lieut.-Col. W. F. Prideaux.

STATISTICAL SOCIETY.

November 21.—J. Heywood, Esq., President, in the chair. After a long list of candidates had been elected Fellows, the President delivered his opening address, in the course of which it was stated that the Howard medal for 1876 (with £20) had been awarded to Dr. J. C. Steele, Medical Superintendent of Guy's Hospital. At the close of the address the medal referred to was presented to Dr. Steele, and the subject of the essay for next year's medal was announced to be "On the Condition and Management, Past and Present, of the Workhouses and Similar Pauper Institutions in England and Wales, and their Effect on the Health, Intelligence, and Morals of the Inmates." Dr. F. J. Mouat read a Report on the International Statistical Congress recently held at Budapest, to which several Fellows of the Society had been appointed delegates.

QUEKETT MICROSCOPICAL SOCIETY. NOVEMBER 24.—H. Lee, Esq., President, in the chair. Two new members were elected. A paper, by Mr. C. F. George, "On a Species of Argus found in the Tower of Blyborough Church," was read by Mr. Curties, and illustrated by numerous drawings, and by specimens and preparations exhibited under the microscope. Mr. C. Stewart gave an address, "On the Histology of Skin," commencing with the earliest development from the simple cell in the lowest types, and proceeding to notice in succession the skin with its appendages in the mollusca, fishes, birds, animals, and man.

APPLICATIONS FOR LETTERS PATENT.

(*Continued from page* 2.)

On July 24th.—2981 to 2991.—C. Scott. Fæcal closets and the treatment of excreta.—J. C. Mewburn. Throstle frames (com.) — W. McLennan. Lifting and force pumps.—S. Kott. Weather protectors to be used as substitutes for umbrellas.—E. H. Leveaux. Portable and other steam engines.—T. Allen. Boxes for holding matches and other articles.—J. W. Barclay, M.P. and R. Sellar. Combined cultivator and digger.—L. V. Rathbun. Apparatus for cleaning the cloths in bolting reels for flouring mills. —H. Baker. Machine for preparing or cutting suet and other purposes.—T. Judge. Cases for the carriage and storage of gunpowder and other explosive compounds.—W. McIntyre Cranston. Threshing and straw-binding machines, the two being in combination.

On July 25th.—2992 to 3006.—A. C. Herts. Pencil sharpeners, such pencil sharpeners being applicable for use of all kinds of pencils (com.) —J. H. Tozer. Permanent way of railways — T. G. Messenger. Valves for the circulation of hot water, also applicable to the circulation of cold water, gas, or other fluids.—A. Higginson. Motive-power engines.—C. Tringuetta. Propulsion of steamers, being also applicable to other purposes.—J. Waugh. Implements for the gathering and cleansing of root crops, stone gathering, embankment making, and road grading. — W. McI. Cranston. Harvesting machines.—T. Bradford. Machine or apparatus for washing and peeling potatoes or other vegetables or roots.—S. Osborn. Lubricating apparatus (com.)—J. Whitestone. Lighting and heating apparatus.—W. R. Lake. Lanterns and candlesticks (com.) — R. H. Ridout. Methods of constructing galvanometers.—J. C. Blain. Rotary engine to be worked by atmospheric pressure. — M. Kitchen. "Stocks" employed in the manufacture of leather.—R. J. Hutchings, Machinery or apparatus for manufacturing tin, terne, and metal plates.

On July 26th.—3007 to 3021.—A. L. S. Leighs. Casing rendering any fort, vessel, or other object impenetratable to projectile and damage by torpedo.—R. Hempsted and W. Watkinson. Mode of working cut-off slide valves.—J. Harrington. A new game.—W. Smith. Fluid meters or engines for measuring or obtaining power from water, air, or gas. (Complete specification.)—S. Gee, G. Gibbs, and F. J. Garnett. Bottles, jars, and other vessels used for containing liquids or other substances, and the means or apparatus employed for stopping the same, partly having reference to the apparatus for forming the necks of bottles, jars, or other vessels. -T. A. Edison. Acoustic telegraphs.—E. G. Brewer. Organ pipes or tubes (com.)—H. Parsons. Joining or connecting pipes.—H. Sellers. Staples for fastening wire fencing, and for other like purposes.—H. Page. Method of and apparatus for transmitting written messages.—S. P. Bidder. Electric telegraphs.—J. Périnaud and J. Marchal. Process of supplying dyed silk fabrics — W. Conquest. Machinery or apparatus for folding paper (com.)—H. E. Newton. Construction of portable railways and the rolling stock and other appliances to be used therewith (com.)— A. M. Clark. Apparatus for washing barrels, bottles, and other vessels (com.)

On July 27th.—3022 to 3033.—W. K. Croby· Construction of roller skates·—J. Casstles. Machinery for moulding.—G. Tompkins. Machinery for making bricks.—H. B. Young Marine steam engines for driving screw and other propellers.—T. Jesson. Manufacture of bass, carpet, and other brooms and brushes, and the apparatus employed therein.—E. Clark. Ladies wear.—G. H. Hebblethwaite. Production of a waterproof fabric.—J. Cleminson. Articulating and radiating the axles of railway and tramway carriages and brakes connected therewith, in part applicable to other railway carriages.—J. Salmond. Potato lifter.—E. Edwards and H. Shaw. Metallic pens.—W. R. Lake. Machinery for opening, breaking, scutching, and cleaning cotton wool and other fibrous materials (com.) — W. E. Newton. Apparatus for burning or destroying noxious gases or mephitic vapours (com.)

On July 28th.—3034 to 3047.—T. A. Dillon. Raising and floating submerged vessels or other bodies.—A. Budenberg. Steam-engine and other motive power governors, known as "Busse Governors (com.)—J. C. Mewburn. Flying or aërial toy (com.)—C. Cowdery. Atmospheric brakes for railway and other carriages and vehicles.—S. Bagnall. Apparatus for doubling yarns.—C. T. W. Piper. Venetian blinds.— J. McMillan. Apparatus for rivetting iron ships or other structures.—S. Cook. Grates used in looms for weaving.—J. Day. Attachments or apparatus applicable to roller blinds, map, and other winding up rollers.—T. Rickett. Machinery for manufacture of screws.—C. M. Jacob. Sealing of wine, liquors, preserves, and other bottles and jars.—W. R. Lake. Oil-burning stoves and apparatus connected therewith (com.)—F. Wirth. Water raising apparatus for table fountains and other like purposes (com.)—J. Good. Apparatus for transmitting motion to driving bands and traction ropes.

On July 29th.—3048 to 3057.—A. Lyle. Apparatus for shaping sugar.—C. H. Murray. Pressing or embossing bricks, quarries, tiles, and other analogous articles. — R. Reichenheim. Method of preparing hare skins for articles of dress.—L. Biermanns. Albums (com.)—C. Burton. Shuttles.—R. A. Hardcastle. Speed or revolution indicators.—C. Buchanan. Lithographic printing presses.—A. M. Clark. Apparatus for producing heat by the combustion of gases or vapours, applicable for surgical and other purposes (com.)—E. V. Gardner. Manufacture of explosive compounds, and construction of apparatus to be employed therein.—R. Bennett. Apparatus for finishing needles.

On July 31st.—3058 to 3071.—J. N. Blamphin. Perambulators.—R. Henly. Bagatelle or game board.—E. Whitehall. Machinery for ruching, pleating, gophering, crimping, and making up millinery and other trimmings.—J. W. Graham and A. Graham. Machinery for cutting stone. —G. Hodgson and J. Broadley and J. Lister. Looms for weaving.—W. Chalmers. Construction of windows.—W. R. Lake. Removal of hair or wool from raw or dry skins, and preservation of the same (com.)—J. H. Greenhill. Grain sieves.—R. B. Hansell. Draw gear or or traction appapatus and buffing arrangements of railway carriages, and other similar vehicles. —J. Hutton. Pistons.—A. F. Firth and J. Boothman. Looms.—J. Cockshott. Combined apparatus to be used by chemists, druggists, and others, for dispensing purposes. (Complete specification.)—F. Kingston. Machinery for cutting and bundling sticks for fire wood.—L. Chapman. Machinery for planing thin boards, and apparatus for sharpening the cutters for the same.

On August 4th.—3106 to 3115.—J. Osmond. Dog carts and other two-wheeled vehicles.—W. F. Grier. Compound for the preservation of animal and other substances, the same being applicable for other purpeses.—J. Butchart. Manufacture of textile fabrics.—J. L. Taylor and R. Ramsden. Mules for spinning and doubling.—J. Sample. Governor for marine engines.—D. G. Hoey. Blast furnaces and apparatus connected therewith.—H. A. Bonneville. Elevators for buildings (com.) (Complete specification.)—H. Pearce. Studs and solitaires.—W. Noll. Apparatus or appliances for "tapping" casks or other vessels, and drawing off fluids from same.—S. Andrews. Fastenings for joining millbanding, and for other like purposes.

On August 5th.—3116 to 3133.—E. Fulton. Packing cases or crates.—T. Lewis. Internal reversible stoppers for aërated or gaseous liquids.—J. B. van Oosterwyck. Method of elevating liquids and means to be employed for that purpose.—W. R. M. Thomson. Drying tea, and the apparatus employed therefor (com). G. Green. Bridles.—F. D. Taylor. Connecting or fastening buttons to wearing apparel, boots and shoes, and other articles.—E. Pace. Machinery or apparatus for scoring or marking and preparing "squelettes" or blanks for making match and other boxes, and for other purposes.—J. W. Gray, C.E. Reversible table cloth (com.)—G. Robertson. Apparatus for exhausting gas, and applicable for inducing currents of various fluid or pulverised or granular matters.—A. Fryer. Method of and apparatus for treating the refuse of towns, partly applicable to the concentration and treatment of saccharine, saline, and other solutions.—J. T. Coulthard. Safety valves.—F. E. Spiller. Means for securing and for obtaining access to the interior of air-tight metallic cases.—H. Sutcliffe and W. Sutcliffe. Machinery and apparatus to be employed in the manufacture of plumbers' pipe hooks.—W. F. Tindell. Manufacture of boxes and other hollow articles from paper pulp, and apparatus therefor (com.)—F. J. Bell. Application of bodily weight and muscular power to propelling or driving power purposes, and apparatus therefor.—J. E. Fisk. Machines for whitening and buffing leather. (Complete specification.)—S. H. Sharp. Machinery for splitting, shaving, and "bufting" leather hides or skins.—S. H. Sharp. Machinery or apparatus for cutting or dividing leather into strips or lengths.

On August 7th. -3134.—R. H. Tweddell, J. Platt, and J. Fielding. Hydraulic presses for stamping, forging, and shaping metals.

On August 8th.—3135 to 3142.—C. E. Firmstone. Construction of cart arms and boxes and axle arms and boxes for more effectually preventing the accumulation of dirt and other matter in the boxes.—G. Jowett and C. Rushworth. Stoppers for bottles or other similar articles, and the method of and means for securing the same of the necks of the bottles.—W. Morgan-Brown. Cooking utensils (com.)—S. G. L. Fox. Means or apparatus for lighting and extinguishing gas lamps by electricity.—J. Upton. Shoes for horses and other animals.—J. Gruyer. Construction of umbrellas and parasols.—E. G. Brewer. Safety apparatus for raising and lowering weights, applicable as fire escapes and for other purposes (com.)—G. Lindemann. Construction of street tramways, and the method of regulating the action of compressed air when used for driving carriages on such ways.

On August 9th.—3143 to 3161.—G. G. Caldwell. Hydraulic propellers for vessels. (Complete Specification.)—B. Berry. Weaving and apparatus connected therewith.—E. S. Cathels. Apparatus used in the purification of gas. (Complete specification.)—W. Bowker. Boiler-tube ferrule extractor.—W. Bowker. Equilibrium discharge or blow-off cock.—I. Swindells and R. Lancaster. Manufacture of ammonia.—W. Thomas. Railway brakes.—J. Macnab. Getting coal and other minerals, blasting or disintegrating rock, and the apparatus to be employed therein, parts of which apparatus are also applicable for other purposes.—C. Forrest and A. Forrest. Machine for drying and powdering blood or other material.—E. A. Cowper. Apparatus for cutting coal.—W. Halbert. Winding thread or yarn, and machinery or apparatus employed therefor. E. de Pass. Apparatus for perforating, piercing, punching, or cutting paper, cardboard, metal, and other materials, and the manufacture of certain parts of such apparatus (com.)—J. B. Handyside, S. Al[illegible]y, and J. H. Carruthers. Wheels.—J. A. Gibbs. Apparatus for economising fuel and diminishing the production of smoke in fire-places, stoves, and furnaces.—J. A. Mays. Means of effecting locomotion.—J.

G. Tongue. Seats, benches, and chairs, for the purpose of advertising in parks, promenades. and other public places (com.)—H. E. Newton, Device for supporting stockings (com.)—C. Madge. Mode of treating tin and terne plate scrap for the utilization of the same.—J. J. Thomas. Apparatus for separating liquids.

On August 10th.—3162 to 3170.—J. Wilson. Arrangement or construction of cooking ranges. —F. W. Byrne. Modes of and apparatus for marking out ground.—P. Brotherhood. Apparatus for compressing air or other elastic fluid. —J. Bartlett and W. M. Murray. Manufacture of tools for the formation of type, and the manufacture of type.—T. Whitaker and W. Whitaker. Apparatus for automatically regulating the temperature of heating and ventilating apparatus.—W. Dore and C. Wilson. Sewing machines. — H. Lomax. Sewing machine needles.—S. Pitt. Wet treatment of silicate ores of copper, nickel, and cobalt, to obtain the metals or metallic salts (com.)—J. Millar. Mode of treating and clarifying sewage or other impure waters.

On August 11th.—3171 to 3185.—J. W. Wood, W. H. Shakespear, and W. P. Thompson. Railroad signalling.—W. E. Gedge. Waggons or trucks for carrying coal, ore, earth for earthworks and other materials and goods (com.)—W. Young. Carburetting air and gases, and the mechanism or apparatus employed therefor.—J. A. Faulkner and J. H. Starling. Attaching and adjusting knobs and roses to spindles.—H. J. Haddan. Looms (com.)—H. J. Haddan. Valves and gearing for same (com.)—H. J. Haddan. Machinery for dressing tampico and bristles (com.) —J. O. Butler and A. E. H. B. Butler. Machinery for grinding and polishing round metal bars and tubes.—W. Crabtree. Looms for weaving.—H. Bell, jun. Mills for grinding corn.—S. Pitt. Manufacture of articles from copper (com.)—A. Browne. Bathing apparatus, adapted also for saving life (com.)—E. A. Parnell. Utilizing tin-plate scraps or clippings and waste articles made of tin-plate. (Complete specification.)—C. Hill. Construction of fireplaces of kitchen ranges and ship's cooking stoves.—C. Eskrett and W. H. Searle. Wrappers or envelopes for seed crushing and cake making.

On August 12th.—3186 to 3197.—J. A. Desgoffe. Sheet iron uprights for telegraphic posts, chimneys, masts, and all metallic supports.—F. W. Follows and J. Bate. Construction of footsteps and bearings for spindles and shafts.—H. Gardner. Machines for bending certain parts of wire fastenings for bottle stoppers (com.) (Complete specification.) —J. Dryhurst and J. Woodward. Manufacture of door and window plates, advertising plates, and other like plates, and labels for glass bottles and for other like purposes.—F. Tew. Braces or suspenders, partly applicable for other purposes.—C. F. De Kierzkowski. Pressure generators for motive engines, and the application of motive engines to the propulsion of tram cars and other carriages.—G. Raynor, J. Harrison, and W. Glendenning. Apparatus for washing clothes and other similar articles, applicable also for churning butter.—W. Scholes. Material for "card backs" employed in carding wool, cotton, and other fibrous material.—A. M. Clark. Permanent way of railways (com.)—A. Christophe. Fire-escape apparatus.—J. C. Cole. Machines for breaking, crushing, and grinding stones, ores, minerals, and cements.—W. Hillman. Bicycles, and machinery or apparatus for manufacturing bicycle and other wheels.

On August 14th.—3198 to 3207.—T. Feather. Machinery for compressing air.—W. A. Comber. Pulley blocks.—H. Ainley. Apparatus employed in weaving.—J. E. Morce. Manufacture of candles for effecting economy in the use thereof, and for dispensing with "savealls."—R. Hall and S. Priestly. Machines or apparatus for making spiral metallic bands.—G. M. Phelps. Printing telegraphs.—N. Jochumson. Steering gear.—W. E. Gedge. Improvement applicable to the spinning machines known as self-acting mules (com.)—The Baron T. de Mouncie. Revolving cylinder pistols.—W. R. Lake. Punch or projectile (com.) (Complete specification.)

On August 15th.—3208 to 3221.—J. Cooper. Lace machinery.—L. A. L. P. de la Peyrouse, M.D. Manufacture of gas.—C. K. K. Bishop. Organs.—W. Ireland. Treatment of iron and steel for cleansing and annealing, coating with other metals, welding, and case hardening (partly com.)—A. D. Potter. Apparatus for saving the breakage of coals when delivering the same from colliery screens or otherwise into waggons or other receptacles.—J. Wotherspoon. Manufacture of asbestos paper and millboard.—W. J. Dix. Apparatus for sealing the corks of bottles, jars, and other like articles, also applicable for other purposes.—W. Winter. Means or apparatus for preserving pencils and other writing implements employed for scholastic or other purposes.—A. R. Frost. Apparatus applied to organs, harmoniums, and other free reed instruments for tuning same (com.) (Complete specification.)—E. G. Brewer. Printing machines (com.)—J. B. P. A. Thierry. Smoke consuming apparatus, and machinery for making such apparatus.—W. S. Simpson. Fire-arms. —A. F. Mills. Construction of key for tuning pianofortes and other stringed instruments.—E. L. Brundage. Machinery for forging horseshoe nails and other small articles.

On August 16th.—3222 to 3232.—H. G. Cardozo. Apparatus for stoppering bottles, jars, and other receptacles for containing fluid or solid matters, also suitable for wiring said articles.—G. R. Willett. Washing machines.—A. D. Wolochoff. Machinery or apparatus for producing or marking the divisions upon objects of different substances, having curved, flat, or other surfaces, more especially applicable to the marking or dividing of all kinds of instruments and apparatus used in the sciences.—G. W. D. Scott. Steam generators. — F. Reddaway. Looms for weaving hose or tubular goods.—T. Baldwin and W. H. Bailey. Pressure gauges.—J. Higgins and T. S. Whitworth. Machines for spinning and doubling cotton and other fibrous material.—T. L. Nash. Animal trap.—W. E. Everitt. Steam-boilers of locomotive engines, also applicable to other steam-boilers. —D. B. Peebles. Apparatus for governing, or regulating and adjusting, or otherwise acting on the flow or pressure of illuminating gas; partly applicable to two-way or multiple-way valves for other fluids.—W. Rainforth, sen. and W. Rainforth, jun. Steam cultivating apparatus or implements.

On August 17th.—3233 to 3243.—A. Pike. Napkin or serviette rings.—H. Stott. Ventilating steam vessels or ships. — G. Forbes. Writing machines.—B. J. B. Mills. Manufacture of fecula, farina, and starch (com.)—R. Cane. Construction of portable bedsteads, cots, or hammocks. — W. H. Johnson and W. Armitage. Machinery for weaving wire gauze. —E. Firth and T. Wolstencroft. Construction of springs used in wringing machines, also applicable for other useful purposes.—T. Bailey. Breech-loading small-arms.—J. Ledger. Registers of steam-boilers (com.)—J. Jowitt and E. Wood. Boiler furnace, and other doors.—W. Morgan-Brown. Varnishes for wood, iron, and other materials, and the machinery for and method of applying it (com.)

On August 18th.—3244 to 3254.—P. G. Wilson. Brooches, whereby they are rendered convertible into pendants.—J. W. Knight. Combined shirt front and vest.—A. C. Kirk. Steam engines for ships of war.—B. C. Scott. Flasks as regards the stoppering and stoppers for the same.—A. Browne. Mode and means for producing paintings on all kind of textile and other fabrics (com.) (Complete Specification.) L. P. P. Othon. Motive-power engines.—B. W. Rogers. Braces for drilling.—E. G. C. Bomford. Apparatus used in the training or growing hops.—J. Davies. Steam engines.—J. Scattergood. Manufacture of railway spikes and cotters or keys, and machinery to be used in said manufacture.—W. H. Samson. Machinery or apparatus employed in cultivating land, and method of working same, and of communicating motion to agricultural and other machinery.

August 19th.—3255 to 3271.—W. B. Haigh. Mitre-cutting machines for wood.—W. Rushworth. Jar and bottle stoppers.—J. H. Johnson. Apparatus for containing and preserving food (com.)—J. Goulding. Spinning, and mechanism therefor. (Complete specification.)—H. Gardner. Lamps, applicable for lighting railway carriages, ships, houses, and other structures or places (com.)—M. McEwen. Manufacture of tobacco, and the means employed therefor.—J. Mc Whinnie. Indicating distances travelled by tramway cars, omnibuses, and other vehicles, and the means employed therefor.—W. Burns. Fittings for casks, jars, or other vessels of earthenware, porcelain, glass, or other material, for containing wine, beer, or other liquids.—A. C. Henderson. Broom-handle shield or protector (com.)—A. M. Clark. Dynamo-electric and magneto-electric machines (com.)—W. R. Lake. Velocipedes (com.) (Complete specification.)—W. Bown. Construction of wheels or rollers for roller skates and for other purposes. G. Martineau. Machinery for cutting and packing sugar (com.)—G. Hollyer. Embossing on glass, producing every description of design, ornamentation, letters, and devices with effects of light and shadow by means of graduated shades.—A. C. F. Franklin. Wheel or roller skates.—J. G. Tongue. Means and processes for obtaining colouring matters from cannel, anthracite, and other coals applicable to various useful purposes (com.)—T. Morgan. Steam engines (com.)

On August 21st.—3272 to 3284.—A. Westwood. Self-acting smoke-consuming furnace, applicable to all kinds of furnaces for generating steam or otherwise.—F. Wirth. Method of and apparatus for fastening the frames on travelling bags (com.)—A. M. Clark. Smoothing planes (com.) H. Glendining. Locks and latches.—P. Griffin. Manufacture of whisky and other spirits, and apparatus for the same.—F. J. Bolton, F. E. B. Beaumont, and W. H. Ashwell. Production, manufacture, and utilization of castings produced from the metallic slags and bi-products arising from the treatment of metallic ores and metal in furnaces.—J. Mills. Arrangements for illuminating clock dials and semi-opaque signs.—J. Gallie and W. H. Sinnatt. Differential pulley-blocks or hoisting tackle.—A. B. Lockett. Appliances for supporting the body in water and facilitating swimming.—G. D'Haisne. Mechanical and elastic beds, especially adapted for the use of wounded and sick persons.—D. G. Hoey. Blast furnaces and apparatus connected therewith.—J. M. Corbet. Method of attaching reels to fishing rods.—W. P. Bonwick. Velocipede.

On August 22nd.—3285 to 3301.—C. A. Herzog. Watches (com.) (Complete specification.)—W. H. Llewellyn. Wheels for colliery "trams" "corves," or waggons, and the means of lubricating the axles thereof.—J. Caldwell. Unguent for the treatment of sores of any description, whether such sores be upon a human being or upon an animal.—J. Wilding. Construction of washing machines.—P. Charpentier. Furnaces and the apparatus connected therewith.—J. Harrington. Manufacture of artificial or imitation leather.—F. T. Lawden and J. Thomas. Breech-loading small arms.—E. Lecomte. Pianoforte named eolian-piano.—W. R. Lake. Method of preventing the production of smoke from furnaces (com.)—W. R. Lake. The sewing or stitching of leather or other like materials, and machinery therefor, chiefly designed for the manufacture of harness and boots and shoes (com.)—W. L. Wise. Furnaces (com.)—L. E. Evans. Fences and materials therefor.—A. W. Tuer. Manifold copying.—J. H. Johnson. Process and apparatus for producing photographic images upon or ornamenting glass or glazed or enamelled articles (com.)—H. Funke. Handles for pocket knives, and which may be applied to other knives (com.)—E. S. Eyland. Roller skates. (Complete specification.)—A. Browne. Memorandum tablets (com.)

On August 23rd.—3302 to 3317.—G. F. Griffin. Manufacture of boxes for matches and other articles.—R. Wilson. Hydraulic presses (partly com.)—E. H. Thomson. Apparatus or appliances for counting and recording the number of persons entering or leaving public vehicles, theatres, or other places.—W. Morgan-Brown. Circulating devices for steam boilers (com.)—J. D. E. Huddart. Obtaining motive power.—H. Staples. Purification of sewage liquid, night-soil, urine, and other foul waters or liquids, and the manufacture of precipitating agents to be used therein.—A. F. Osler. Vehicles propelled by the persons travelling in them.—C. Harrold. Manufacture of watch pendants and tools or machinery employed in the said manufacture.—W. White. Treatment of coffee and cocoa beans for the preparation of the beverages of coffee and cocoa.—H. Barber and T. O. Crocker. Sleigh or apparatus to be used in connection with skating rinks.—T. Lloyd. Ventilating louvre cap or cowl.—E. Middleton. Miners' safety lamps.—J. Hollway. Production of metals or metallic alloys and the process employed therefor.—J. H. Johnson. Production of electric light for signalling and other purposes, and apparatus or means employed therefor and in connection therewith (com.)—H. A. Egerton. Construction of floating piers and other analogous structures, for embarking and disembarking passengers, animals, or merchandise.—I. Pick. "Costume pocket" with muff combined as one article.

On August 24th.—3318 to 3335.—W. S. Mappin. Construction of roller skates.—J. D. Duckett. Cistern and self-acting water-waste preventor (superseding the ball-float).—C. M. Westmacott. Utilising the weight of the human body as a motive power.—W. Metcalf. Ornamental screens for grates, fire-places, stoves, and other similar articles.—C. F. Elliott and J. Bayley. Sliding stud for fastening zinc and other metal sheets so as to allow for expansion and contraction.—T. F. Passman. Steam boilers.—J. S. Kershaw. Apparatus for stretching woollen or mixed woollen and cotton cloths, which apparatus is to be used in conjunction with "tentering" machines for drying woollen cloths.—J. Dearden. Apparatus for spinning and doubling cotton and other fibrous substances.—J. Lawson. Woven fabrics to be used as carpets, rugs, curtains, table-covers and the like.—A. Steenberg. Advertising playing cards (com.)—A. M. Clark. Starting gear for tram cars and other vehicles (com.)—A. Whitcombe. Screws, bolts, hooks, and pullies.—A. Whitcombe. All carriages, harness, wheels, and axletrees.—W. Montague. Dress suspender. T. D. Clare. Autographic printing.—D. Greig and G. Achilles. Traction engines and other locomotive engines driven by means of gear wheels.—W. Young. Means or apparatus employed in supplying furnaces and fire-places with fuel.—J. A. Mays. Roller skates and the rollers or wheels thereof.

On August 25th.—3336 to 3349.—R. Ramsey. Detaching or safety apparatus for preventing accidents from overwinding in mines or other shafts, lifts, or hoists.—J. Craig. Connecting and disconnecting device for the driving wheels of sewing machines.—W. Connell. Printing machinery. W. Dewar and A. Crichton. Machine for up-rooting and shawing turnips.—J. Lang. Telescopic and rotary toilet mirror.—W. F. Barrett. Safes.—W. Lord and L. Kaberry. Machinery for cleaning cotton.—T. R. Brailsford. Construction of railway and tramway carriages.—J. Cutlan. Construction of sewing machines for boots and shoes (com.)—H. M. Whitehead. Preserving meat in solid form.—F. G. Morton. Method of treating paraffine and other fats or fatty matters.—H. J. Haddan. Construction of railways (com.) (Complete specification.)—H. J. Haddan. Machinery for the disintegration of quartz and other substances (com.)—W. R. Lake. Sewing machinery for the manufacture of boots and shoes (com.)

On August 26th.—3350 to 3365.—H. J. Haddon. Railroadtie (com.)—J. Crabtree. Apparatus for deepening rivers, making courses or receptacles for water, and removing deposits and obstructions in natural or artificial water-courses or receptacles.—C. Cousins and J. Brown. Apparatus for locking facing points upon lines of railway.—S. G. Rhodes. Finishing yarn and fabrics and apparatus connected therewith. —R. Drysdale. Manufacture of ornamental fabrics to be used as insertions, edgings, bindings, or other trimmings.—A. Ashworth. Construction of hats.—F. Moore. Solitaires, sleeve links, and other similar dress fastenings.—J. Motherwell. Pen and holder combined.—A. Browne. Method for manufacturing silk from the bark of mulberry trees (com.)—H. Illingworth. Apparatus employed in treating wool and other fibres.—T. A. Freeston. Construction of converting vessels employed for the production of malleable iron or steel. W. H. Davies and F. H. W. Higgins. Telegraphic signalling instruments for transmitting fire and other calls or alarms.—F. Wirth. Brakes for railway carriages (com.)—J. D. Simpson. Machinery or apparatus for breaking or reducing stones and other hard and brittle substances.—T. Morgan. Floor covering (com.)—J. Frost. Purifying sewage and foul water, and treating water for boiler purposes.

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